Nov. 6, 1962 S. V. BOWLES 3,062,394

REFUSE TRUCK LOADING DEVICE

Filed May 31, 1960 2 Sheets-Sheet 1

Fig. 1

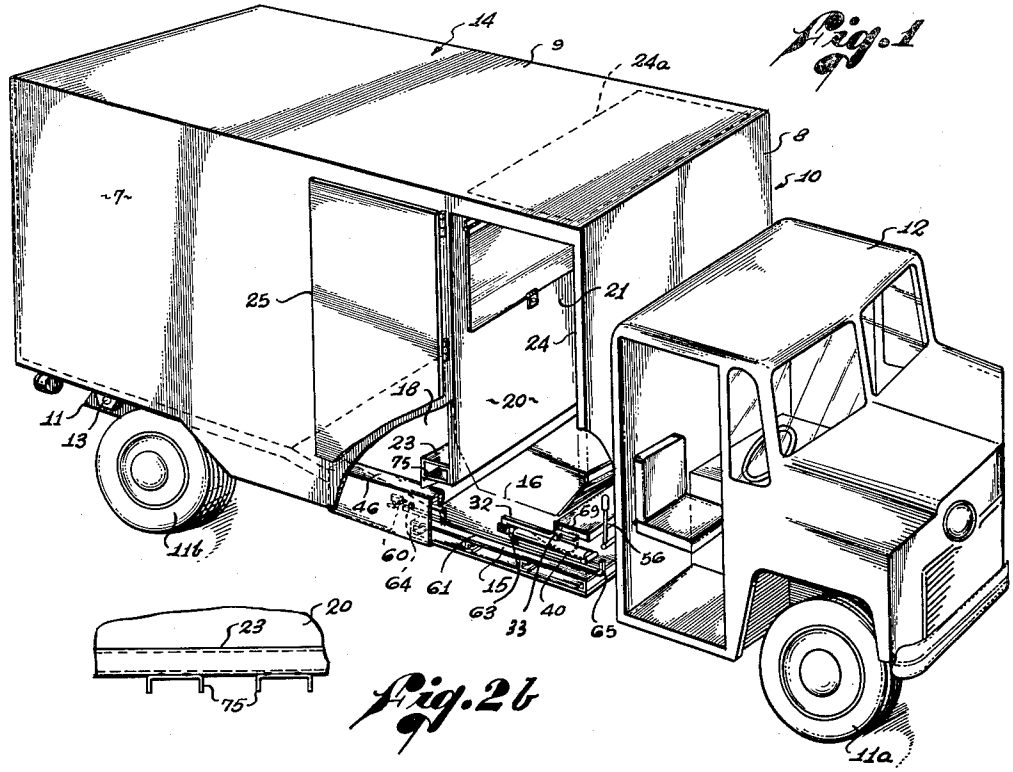
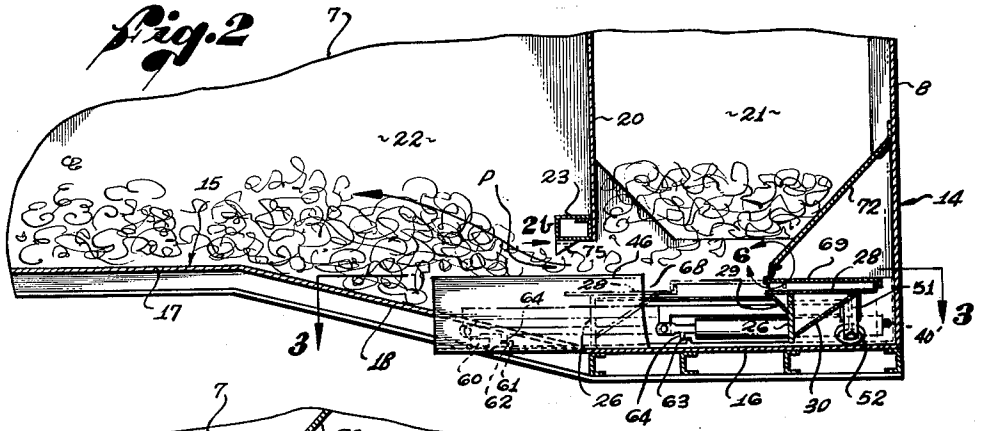


Fig. 2b

Fig. 2



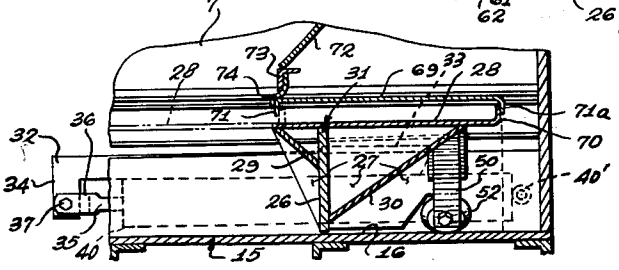


Fig. 2a

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REFUSE TRUCK LOADING DEVICE

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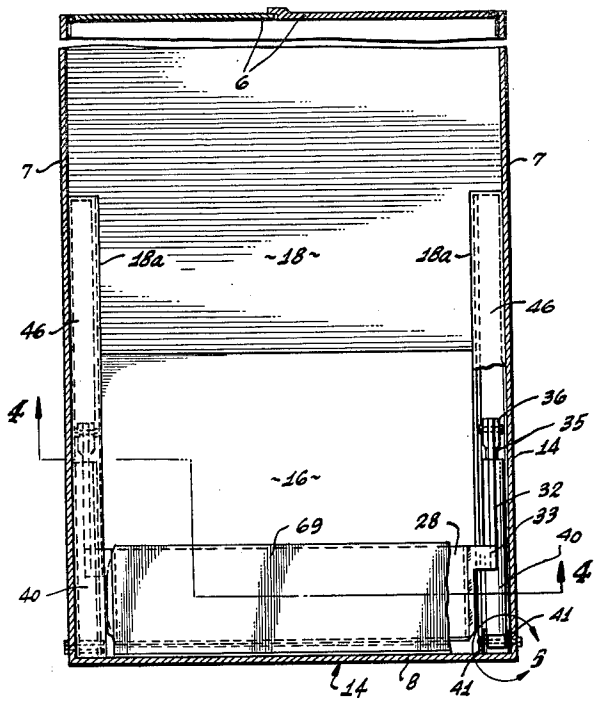


Fig. 3

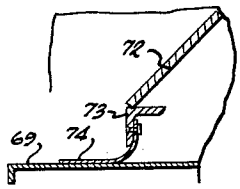


Fig. 6

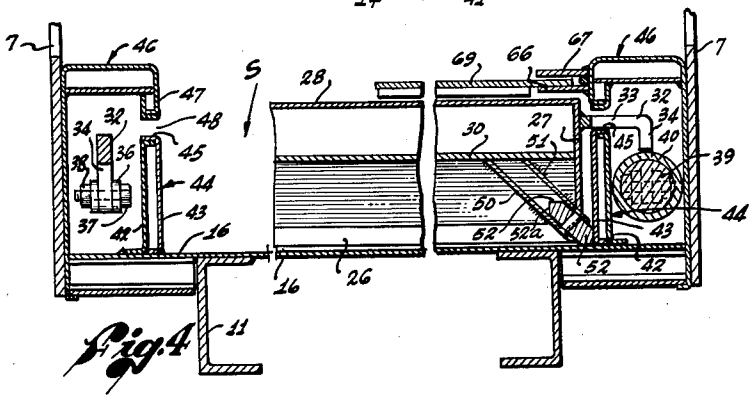


Fig. 4

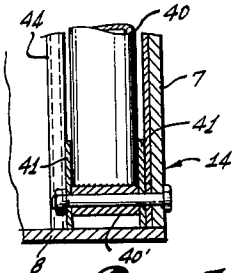


Fig. 5

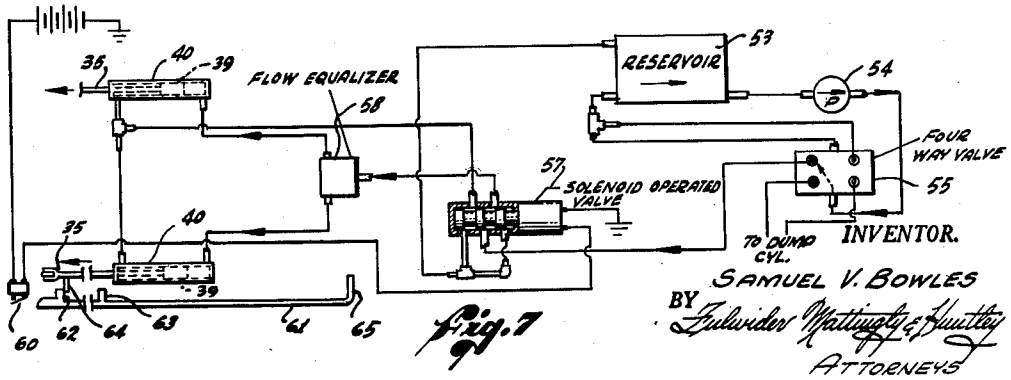


Fig. 7

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United States Patent Office 3,062,394 Patented Nov. 6, 1962

3,062,394

REFUSE TRUCK LOADING DEVICE

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Filed May 31, 1960, Ser. No. 32,765
5 Claims. (Cl. 214—83.3)

This invention relates generally to loading devices, and more particularly to loading devices adapted for use on refuse-collecting trucks.

Various types of self-loading refuse trucks have been in use for some time, many of which embody a pair of loading arms pivotally mounted on opposite sides of the chassis to lift loads of refuse into the body. Supported between the free ends of such loading arms is a refuse-receiving bucket. Power-operated means are normally provided both to swing the arms and to tilt the bucket. In use, the bucket is lowered to a convenient working height either to the front or to the rear of the truck, by swinging the arms downwardly. The bucket is then filled with trash and swung upwardly over the open top of a high-walled receptacle body, and mechanically dumped therein. This is a considerable improvement over the earlier method of manually dumping containers directly into the receptacle body, though it is not entirely satisfactory.

Refuse obviously cannot be placed in the bucket while it is being raised for dumping or being lowered back to ground level. Consequently, workmen must frequently wait for the return of the empty bucket, resulting in lost time.

In addition, the above-described system requires an open-top body, from which trash occasionally spills or blows, creating an unsightly and unsanitary condition.

Still another disadvantage of previous loading methods is that the refuse is not distributed and compacted within the body for maximum loading of the truck.

A major feature of my invention is to provide a packing mechanism which is so associated with a loading compartment and the main storage compartment of the truck that the refuse is distributed and compacted for maximum loading of the truck. This feature may, with advantage, be incorporated in top loading trucks and thus eliminate some of the disadvantages mentioned above. However, I have illustrated a preferred embodiment of the invention wherein the loading compartment is loaded from the side of the truck and in such association with the truck parts as to eliminate all of said disadvantages and to give added advantages.

Accordingly, although the following objects of the invention and the detailed description will be directed to the side-loaded type of truck, this is not to be construed as limitative on such of the claims as do not specify side-loading.

It is a primary object of the invention to provide an automatic loading device operable on a refuse truck to compact the refuse into an enclosed storage compartment, thereby increasing the density of the load, and hence, the over-all load carrying capacity.

Another object is to provide a refuse truck equipped with an improved loading device whereby individual refuse containers may be intermittently or constantly dumped into the loading compartment without interrupting the continuous loading of the storage compartment, or vice versa.

Another object is to provide a refuse truck equipped with a power-operated loading device wherein the danger of spilling refuse, during both the loading operation and the travel-period of the truck, is reduced to a minimum.

A further object is to provide a refuse truck equipped with a loading device which, in operation and transport, is particularly safe and otherwise well adapted for use

in urban areas where there are likely to be traffic congestions, height obstacles, and playing children.

These and other objects and advantages of the invention will be better understood by referring to the following detailed description taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a perspective view of a refuse truck equipped with the loading mechanism of the invention, certain parts being broken away and removed in order to show underlying parts more clearly;

FIGURE 2 is a fragmentary longitudinal section taken on a plane through the center of the truck with certain parts being broken away;

FIGURE 2*a* is an enlarged detail view of a portion of FIGURE 2;

FIGURE 2*b* is an enlarged detail view taken in the direction of the arrow 2*b* in FIGURE 2;

FIGURE 3 is a plan section of the body of the truck taken on the line 3—3 of FIGURE 2 with certain parts being broken away;

FIGURE 4 is an enlarged sectional view taken along the broken line 4—4 of FIGURE 3;

FIGURE 5 is an enlarged sectional view of the area encircled by the line 5—5 of FIGURE 3;

FIGURE 6 is an enlarged detail section of the area encircled by the line 6 in FIGURE 2; and

FIGURE 7 is a schematic diagram of the system used to operate the invention.

With reference to the drawings, and in particular to FIGURE 1, numeral 10 designates generally a refuse collecting truck having a chassis 11 supported as usual on axles (not shown) carrying front wheels 11*a* and rear wheels 11*b*. A cab 12 is mounted on the chassis 11. Pivotally mounted on the rear of the chassis as at 13 is an enclosed receptacle body 14 adapted to tilt upwardly for dumping the contents through hinged doors 6 forming the rear wall of the body 14. Tilting of the body 14 is accomplished by conventional hydraulic means (not shown). The body 14 further includes side walls 7, a front wall 8 and a roof 9. The aforementioned details of the construction and arrangement of the truck are well known in the art and, therefore, are not described in further detail.

The receptacle body 14 is formed with a floor 15 having a depressed forward portion 16 and an elevated rearward portion 17 joined by an inclined, intermediate ramp 18. The depressed portion 16 is relatively low, for the convenience of the loading operators, whereas the rearward portion 17 is necessarily raised to clear the rear wheels 11*b*. Vertically spaced above the junction of the depressed portion 16 with the inclined ramp 18, is a laterally disposed bulkhead 20 which divides the body 14 into a forward loading compartment 21 and a rearward storage compartment 22. Bulkhead 20 extends from the roof 9 to a point spaced above the floor 16, its lower edge defining the top of a passageway or throat P, to be later discussed. A box beam 23, welded to the lower edge of the bulkhead 20 and to the opposite side walls 7, provides the bulkhead with additional rigidity. In order to afford access to the loading compartment 21 for dumping refuse therein, doorways 24, with hinged doors 25, are provided in the walls 7 at opposite sides of body 14.

In operation it is desired to transfer material from the loading compartment 21 into the storage compartment 22 without interrupting the manual loading operations. For this purpose a vertical packing blade or ram 26 is transversely disposed in the loading compartment 21, and mounted for reciprocation longitudinally of the body between the limiting positions shown in the full and phantom lines in FIGURE 2. End plates 27 are welded to the outer ends of the packing blade 26. A cover plate 28 is welded to the top edges of both the packing blade 26 and the end plates 27, the cover plate being positioned so

that it extends substantially forward of the top edge of the packing blade **26** and, to a lesser extent, to the rear. Two braces or supporting plates **29** and **30** are welded to the packing blade **26**, the end plates **27**, and the cover plate **28** to provide additional strength and rigidity of structure. For convenience in reference, the movable assembly comprising the blade **26** and members **27**, **28**, **29** and **30**, will hereinafter be referred to as the packing blade assembly **31**. At times, the cover plate **28** serves as a shutter, as will be described later.

The packing blade assembly **31** is actuated by hydraulic power applied through a pair of cylinder-piston assemblies **40—39**, arranged, one each, at opposite ends of assembly **31**. Attention is directed to FIGURE 5 where a typical cylinder **40** is shown pivotally connected at **40'** to a pair of support plates **41**, which, in turn, are anchored to the body **14**. The pistons **39** are slidably mounted in the cylinders **40** and are linked to the packing blade assembly **31** by piston rods **35** and draw bars **32**. The piston rods **35** extend from the pistons **39** and are formed with clevises **36** on their free ends. The draw bars **32** are formed with forward, horizontally offset end portions **33** (FIGURE 4) that are welded to the end plates **27** of the packing blade assembly **31**, and with rearward, downwardly turned, end portions **34** that are secured by bolts **37** and nuts **38** to the clevises **36** on the piston rods **35**, as illustrated in FIGURES 2*a* and 4.

In order to protect the cylinder-piston assembly **40—39** from refuse and to aid in supporting and guiding the packing blade assembly **31**, a pair of interior walls **44** with mating covers **46** are provided as a housing. Rising from the depressed portion **16** of the floor **15** immediately inwardly of the cylinders **40** are pairs of interlocking flanged plates **42** and **43** that form the interior walls **44** (FIGURE 4). The top edges of the interior walls **44** provide bearing surfaces **45** that are slidably engaged by the bottom surfaces of the offset portions **33** of draw bars **32**, thereby supporting the rearward portion of the load of the packing blade assembly **31** at the latter is reciprocated. The inclined ramp **18** is notched at **18***a* (FIGURE 3) on both sides of the body to receive the portions of the interior walls **44** that extend rearwardly a sufficient distance to accommodate the required rearward travel of the draw bars **32** and the piston rods **35** during the packing stroke of the assembly **31**.

The covers **46** formed typically of sheet metal, as shown in FIGURE 4, extend longitudinally of the body **14** over the spaces between the side walls of the body and the interior walls **44**. The under faces of the down-turned lips **47** of the covers **46**, are vertically aligned with and spaced above surfaces **45**, defining, with surfaces **45**, a slot **48**.

The width of the space S between walls **44** is, of course less than the width of body **14**, the space defined by said walls and floor portion **16** representing the lowermost portion of loading compartment **21**. The packing blade **26** preferably longitudinally extends the full width of space S as defined by walls **44**, except for working clearance.

A pair of wheels **52**, mounted, one each, on opposite sides of the packing blade assembly **31**, aid in supporting the assembly and in maintaining it in proper alignment; the wheels also giving all the inherent advantages of roller-support. As viewed in FIGURE 4, a given wheel mounting comprises a pair of spaced, parallel flanges **50** and **51** depending from the support plate **30** at approximately a 45° angle to the horizontal. As viewed from the aspect of FIGURE 2, flanges **50**, **51** extend vertically. Rotatably mounted between the free ends of the pair of flanges **50** and **51** are the wheels **52**. Preferably, though not necessarily, each wheel **52** has a periphery of base-to-base, double-cone, configuration, each conical peripheral face **52***a* extending at substantially 45° with respect to the axis of rotation. The junction of the peripheral faces of each wheel is at a junction of bottom **16** and well-plate **43**. As assembly **31** is reciprocated, one peripheral face **52***a* of each wheel engages bottom **16** and the other peripheral face engages wall-plate **43**, whereby the wheels **52** serve the dual purpose of supporting the forward portion of the load of the packing blade assembly **31**, and of maintaining its lateral alignment with respect to the walls **44**.

Hydraulic means are provided for reciprocating the packing blade assembly **31**, a power and control system being schematically illustrated in FIGURE 7. To supply pressurized hydraulic fluid to uptilt and lower the body **14**, the truck is normally equipped with a reservoir **53** and a connected pump **54**. A four-way main valve **55**, among other things, selectively directs fluid in opposite directions through a body-dump circuit or through a loading-device circuit. Thus, as a safety factor, there can be no operation of one circuit while the other is in operation. The body-dump cylinders are not shown since they and the fluid-flow therethrough play no part in the loading-device circuit. A handle **56**, for selectively actuating the main valve **55**, is provided on the chassis **11** adjacent loading compartment **21**, as best shown in FIGURE 1.

The main valve **55** is indicated as being in the position for powering the loading device of the invention. In this position fluid is ported from the main valve **55** through lines to a four-way, solenoid-controlled, spring offset, spool valve **57** which alternately supplies pressurized fluid through lines to either the forward or the rearward ends of the cylinders **40**, with proper alternate exhaust from the opposite ends, for reciprocating the pistons **39**. Interposed in the fluid lines between the valve **57** and the forward ends of the cylinders **40** is a flow equalizer **58** which functions to insure the uniform rearward movement of the pistons **39** relative to the cylinders **40** on opposite sides of the body **14**. Thus, the packing blade **26** remains perpendicular to the side walls of the body **14** regardless of off-center resistance that might otherwise tend to cock it relative to the body as it moves rearwardly. It will be noted that as fluid under pressure is supplied through the valve **57** to either forward or rearward ends of the cylinders **40**, a return passageway is provided from the opposite ends thereof through the valve and back to the reservoir **53**.

A limit switch **60**, actuated by a slidably mounted rod **61**, is utilized to energize the solenoid of valve **57**. The solenoid acts in opposition to a self-contained spring (not shown) for reversing the valve **57** in order to reverse the movement of the pistons **39** at the end of each stroke. The rod **61** is provided with longitudinally spaced, upstanding projections **62** and **63**, which are alternately engaged by a depending projection **64**, provided on one of the piston rods **35**, as the packing blade **26** reaches the limiting positions of travel indicated by the full and phantom lines in FIGURE 2. As the rearward limiting position is reached, the depending projection **64** engages the upstanding projection **62** and slides the rod **61** into contact with the limit switch **60**, thereby actuating that switch and energizing the solenoid of the valve **57**. The solenoid acts to reverse the valve, whereby fluid under pressure is supplied to the rear ends of the cylinders **40**, displacing the pistons **39** forwardly. As the forward limiting position is reached, the depending projection **62** engages the upstanding projection **63** and retracts the rod **61** from contact with the limit switch **60**. This de-energizes the solenoid of the valve **57**, so that said self-contained spring reverses the valve, porting fluid again to the forward ends of the cylinders **40**.

It will be appreciated from the foregoing that the reciprocation of the packing blade assembly **31** is fully automatic. However, should it be necessary or desirable to reverse the direction of movement of the packing blade at any position during the cycle, a handle **65** is provided on the rod **61** just forward of the body **14** for manually actuating the limit switch **60** or for breaking the contact as may be necessary to reverse the blade movement.

Further, the movement of the packing blade assembly 31 may be halted by moving the valve handle 56 to a position where pumped fluid is by-passed around valve 57 or returned directly to reservoir 53.

As the packing blade 26 moves rearwardly from the front of the truck (that is, from full-line to phantom-line position in FIGURE 2) it is essential that refuse from compartment 21 be prevented from dropping behind the blade, else a full return stroke of the blade would be prevented. Cover plate 28, traveling as one with assembly 31 and hence with blade 26, serves as a shutter member to prevent such droppage. The plate thus acts as a false bottom for compartment 21. However, when the cover 28, per se, is of less horizontal extent than the stroke of assembly 31 (as in the illustrated case), it is necessary to compensate for the difference. I do this by providing a follower for or extension of the cover plate, telescopically arranging the cover plate and the follower, so, when the assembly 31 is in the forward or full-line position of FIGURE 2, there is no necessity of providing extra horizontally extending space in the body 14 to accommodate the extension.

The shutter extension or cover followers, here, is in the form of a slidable plate 69. Pairs of vertically spaced horizontal flanges 66 and 67 (FIGURE 4) are welded to covers 46 and are adapted to slidably mount the follower plate 69. The flanges 66 and 67 extend longitudinally from the forward end of the covers 46, terminating at 68 (FIGURE 2). The follower plate 69 is adapted to slide from the forward position shown in full lines to the rearward position shown in phantom lines in FIGURE 2, the terms "forward" and "rearward" meaning, respectively, toward the front and rear of the truck. During reciprocation of the assembly 31, an upturned flange 70 formed along the forward edge of the cover plate 28 alternately engages downturned flanges 71 and 71*a*, formed, respectively, on the rearward and forward edges of the follower plate 69, thereby pulling the plate to the rearward position, or pushing it to the forward position, respectively, as the packing blade assembly 31 moves rearwardly or forwardly.

A baffle plate 72 is provided to guide refuse dumped into loading compartment 21 to the rear of the packing blade 26 as it reciprocates. The baffle plate 72 is hinged at one edge to the forward wall of receptacle body 14 and depends downwardly therefrom at approximately a 45° angle. The lower edge of the baffle plate 72 abuts an angle beam 73 that extends laterally across the body 14.

A leather strip or wiper 74 secured along the lower edge of angle beam 73, substantially as shown in enlarged detail in FIGURE 6, engages the upper surface of follower plate 69 and prevents refuse from being withdrawn under the baffle plate 72, as packing blade assembly 31 and follower plate 69 are forwardly retracted.

It is desirable to prevent refuse in storage compartment 22 from sliding down the inclined ramp 18 into the loading compartment 21. To perform this function, laterally spaced channel members 75 are welded to the lower surface of the box beam 23, as best illustrated in FIGURE 2*b*. The flanges of the channel members 75 incline upwardly and forwardly from their rear edges (FIGURE 2), so they act as teeth restricting refuse in the storage compartment 22 from sliding back into the loading compartment 21, but not interfering with refuse-movement in the opposite direction.

In use, refuse is dumped from hand-carried containers through the side doorways 24 into the loading compartment 21. The depressed portion 16 of the floor 15 is sufficiently low that the bottom of the doorway 24 is at a convenient working height. The control handle 56 is then actuated to continuously reciprocate the packing blade assembly 31 in the manner previously explained. Refuse in the space S, behind the packing blade 26, will be pushed along the floor 15, under the bulkhead 20, and up into the storage compartment 22. It will be noted that the support plate 29 acts as a baffle to keep the refuse from sliding over the top of the packing blade 26 as it moves rearwardly. As the packing blade assembly 31 moves rearwardly, cover plate 26, follower plate 69, and baffle plate 72 cooperate to prevent refuse from falling to the front of the packing blade 26. When the packing blade assembly 31 is retracted forwardly, the follower plate 69 is likewise retracted, and the baffle plate 72 guides the refuse down to the rear of the packing blade 26 for the next cycle. The leather strip 74 prevents refuse from passing between the follower plate 69 and the baffle plate 72.

The nature of the above construction is such that refuse may continuously be dumped into the loading compartment 21, regardless of the position of the packing blade assembly 31, or the fact that it may be reciprocating. If the packing blade assembly 31 is in the extended rearward position, refuse will be dumped on the cover plate 28 and the follower plate 69, whereas it will fall to the floor at 16 if the packing blade assembly is in the retracted forward position. At some intermediate position refuse will fall into both places. Such refuse as falls on top of the plate 28 and plate 69 is scraped off by the baffle 72 when the packer blade is retracted and falls to the floor portion 16.

It will be noted that usual, loosely packed refuse comprising paper and the like will be compacted to some extent, as the packing blade 26 pushes the refuse along the floor 15, through the restricted passage P which is vertically defined by box beam 23 and the directly underlying extent of the floor, and up into the storage compartment 22. Further compaction will result as refuse accumulates in the storage compartment, and the refuse being loaded is compressed against that already in place. And the rear wall 6 of the body 14 forms a final barrier against which the load is compressible. Since bulk is generally the limiting factor in loading refuse trucks, compacting the load effectively increases the capacity of the truck. The effective capacity is further increased by virtue of the enclosed storage compartment, wherein refuse may be loaded flush with the top without any danger of it being spilled or blown out.

A refuse truck embodying the loading device of the invention is particularly safe and convenient for use in urban areas where there are likely to be traffic congestion, height obstacles and playing children. The loading device is completely housed within the body of the truck as opposed to top-loading devices which operate outside the body. Therefore, the probability of injury to the device, to the operators or to children in the area is greatly reduced. Besides reducing the probability of personal injuries, the present loading device is also more convenient. Since it is housed within the truck body, less operating space for a truck of given size is required. In addition, a truck equipped with the present loader can be readily moved when the loading operation is taking place. In the case of some top-loading trucks, the drivers must constantly watch the loading operation to insure that the swinging bucket of the loader does not hit a vehicle or the like.

However, it will be understood that my compacter may be used to advantage in combination with top-loading trucks; for instance, trucks of the type shown in my U.S. Letters Patent No. 2,784,853, issued March 12, 1957. In such case, the opening represented by doorway 24, giving loading access to compartment 21, is shifted to the roof 9, as indicated at 24*a* in FIGURE 1. The trash, delivered through opening 24*a*, drops through the compartment 21 to the floor portion 16, whereupon the packing blade 26 is operated in the manner previously described. The delivery of trash to the top opening 24*a* may be by way of any suitable elevating means or elevating-and-dumping means; as, for instance, the power-operated lifting arms 16 carrying the trippable bucket 18 of said patent.

While I have illustrated and described a preferred em-

bodiment of my invention, I do not wish to be limited thereto except for such limitations as the claims may fairly impart.

I claim:

1. A refuse truck with a chassis supported on front and rear wheels and having a cab mounted thereon, an enclosed receptacle body pivotally mounted on said chassis with its forward wall rearwardly of said cab, and adapted to be tilted upwardly for dumping, a floor in said body, said floor having a depressed portion forward of said rear wheels, and an inclined ramp portion sloping upwardly to a rear portion, a bulkhead laterally disposed in said body substantially in the region of the junction of said depressed portion with said inclined portion of said floor and separating said body into an enclosed loading forward compartment and an enclosed rearward storage compartment integral with said loading compartment, there being a passage below said bulkhead at floor level between said compartments, a doorway in said body opening to said loading compartment, a reciprocable packing blade aligned with said passage and longitudinally movable in said loading compartment along said depressed portion of said floor for pushing refuse thereon through said passage and up said inclined ramp portion to said rear portion of said floor in said storage compartment, a cover connected to the upper edge of said packing blade and longitudinally movable in said body responsive to reciprocation of said packing blade, a baffle mounted in said loading compartment adjacent its front wall and coacting with said cover to guide refuse to the space between said packing blade and said passage as said packing blade reciprocates, and automatic motor means located entirely to the rear of the front wall of the body for reciprocating said packing blade.

2. A refuse truck with a chassis having a cab mounted thereon, a receptacle body mounted on said chassis rearwardly of said cab, a floor in said body, a bulkhead laterally disposed in said body separating it into a loading compartment and a storage compartment, means forming a passage in said bulkhead between said compartments, a doorway in said body opening to said loading compartment, a reciprocable packing blade aligned with said passage, said blade being in and movable longitudinally of said loading compartment along said floor for pushing refuse from said loading compartment through said passage to said storage compartment, a cover spaced above the floor and longitudinally movable in said body in response to said reciprocation of said packing blade, a cover follower with a last motion connection to said cover, a baffle coacting with said cover and said follower to guide refuse to the space between said packing blade and said passage in said bulkhead as said packing blade reciprocates, a pair of hydraulic cylinders mounted on opposite sides of said packing blades in said loading compartment and arranged longitudinally of said body, pistons in said cylinders, draw bars operatively connecting said pistons and said packing blade, a fluid pressure source, a valve and fluid lines for alternately supplying fluid under pressure to either forward or rearward ends of said cylinders to reciprocate said pistons, means for equalizing the fluid flow to said cylinders, whereby said pistons are caused to move in unison in their respective cylinders, and automatic means for controlling said valve.

3. A refuse truck with a chassis having a cab mounted thereon, a receptacle body pivotally mounted on said chassis rearwardly of said cab and adapted to be tilted upwardly for dumping, a floor in said body, a bulkhead laterally disposed in said body separating it into a forward loading compartment having a forward wall and side walls, and a storage compartment, means forming a passage adjacent said floor between said compartments, a doorway in said body opening to said loading compartment, a reciprocable packing blade aligned with said passage, said blade being in and movable longitudinally of said loading compartment along said floor for pushing refuse in said loading compartment through said passage into said storage compartment, a pair of longitudinally extending cylinders mounted in said loading compartment along said side walls outwardly of said packing blade and adjacent said forward wall, pistons in said cylinders, piston rods secured to said pistons and projecting from the rearward ends of said cylinders, draw bars operatively connecting said piston rods and said packing blade, said draw bars extending generally longitudinally of said body and forwardly from said piston rods so that said packing blade reciprocates as aforesaid alongside of said cylinders responsive to movement of said pistons in their associated cylinders, a fluid pressure source, a valve and fluid lines for alternately supplying fluid from said source to the opposite ends of said cylinders to reciprocate their associated pistons, and automatic means for controlling said valve.

4. A refuse truck with a chassis having a cab mounted thereon, a receptacle body pivotally mounted on said chassis rearwardly of said cab and adapted to be tilted upwardly for dumping, a floor in said body, a bulkhead laterally disposed in said body separating it into a loading compartment and a storage compartment, means forming a passage adjacent said floor between said compartments, a doorway in said body opening to said loading compartment, a reciprocable packing blade assembly aligned with said passage, said assembly being in and movable longitudinally of said loading compartment along said floor for pushing refuse in said loading compartment through said passage into said storage compartment, a pair of longitudinally extending hydraulic cylinders mounted in said loading compartment on opposite sides of said packing blade assembly, pistons in said cylinders, piston rods secured to said pistons, means on said body including cooperating pairs of longitudinally extending interior walls and covers for housing said cylinders and pistons, each of said walls being located immediately adjacent one of the outer edges of said assembly, draw bars projecting from said housing means and connecting said piston rods to the sides of said packing blade assembly, each of said draw bars having a longitudinally extending intermediate portion, a forward, horizontally offset end portion secured to the packing blade assembly, and a rearward, downwardly turned end portion secured to the corresponding piston rod, and hydraulic means for moving said pistons in their associated cylinders and thereby reciprocating said packing blade assembly alongside of said housing means.

5. The subject matter of claim 4 including a pair of wheels mounted, one each, on opposite sides of said assembly supporting said assembly for reciprocation, each of said wheels having a periphery of base to base, double cone configuration with one peripheral face engaging the corresponding interior wall in said loading compartment and the other peripheral face engaging the floor.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,062,394 November 6, 1962

Samuel V. Bowles

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 7, lines 15 and 16, for "enclosed loading forward compartment" read -- enclosed forward loading compartment --; line 49, for "last" read -- lost --.

Signed and sealed this 28th day of May 1963.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents