Sept. 1, 1959 L. B. SMITH 2,902,180

REFUSE VEHICLE

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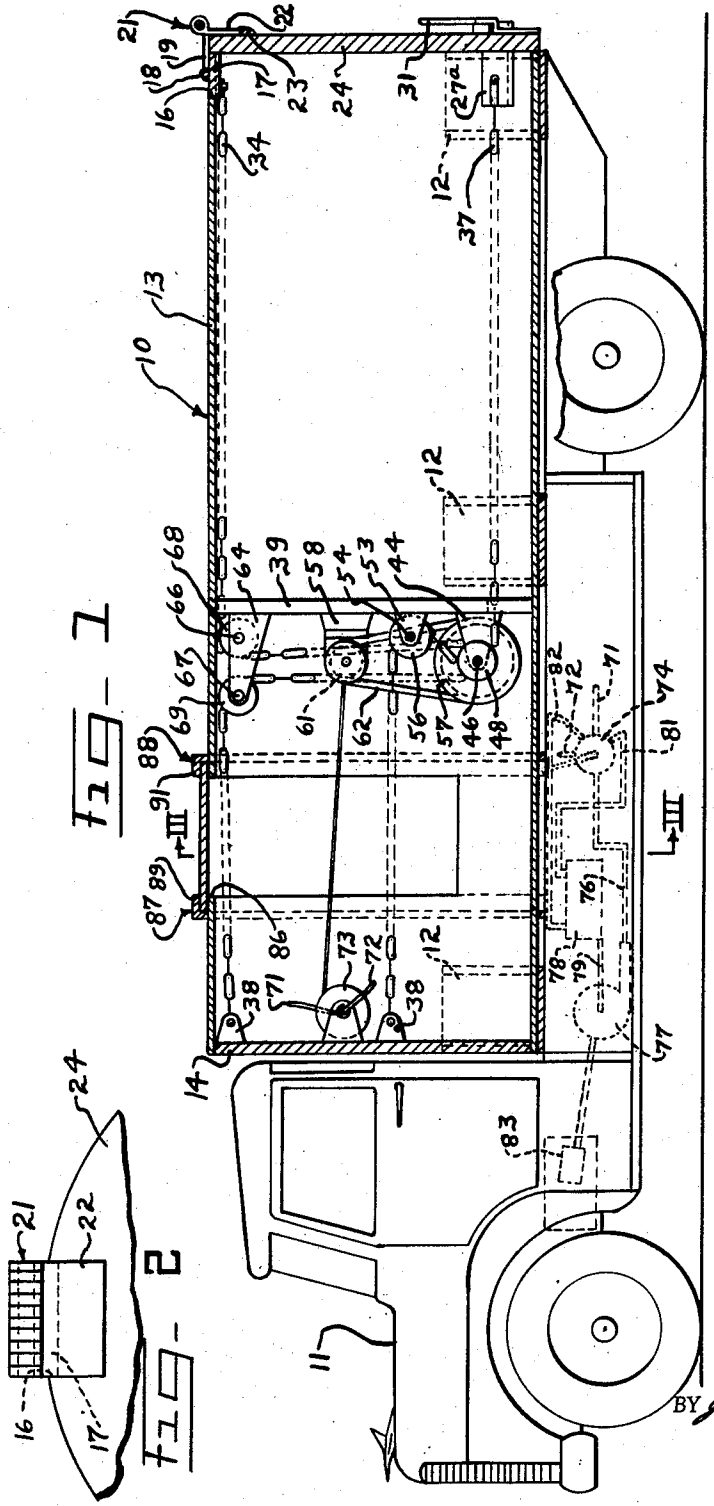


FIG. 1

FIG. 2

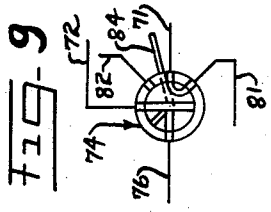


FIG. 9

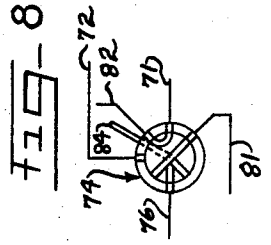


FIG. 8

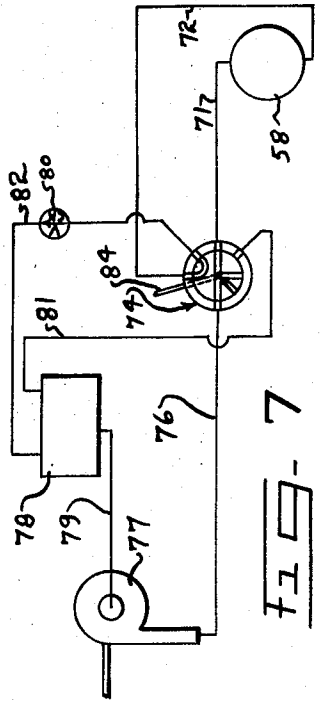


FIG. 7

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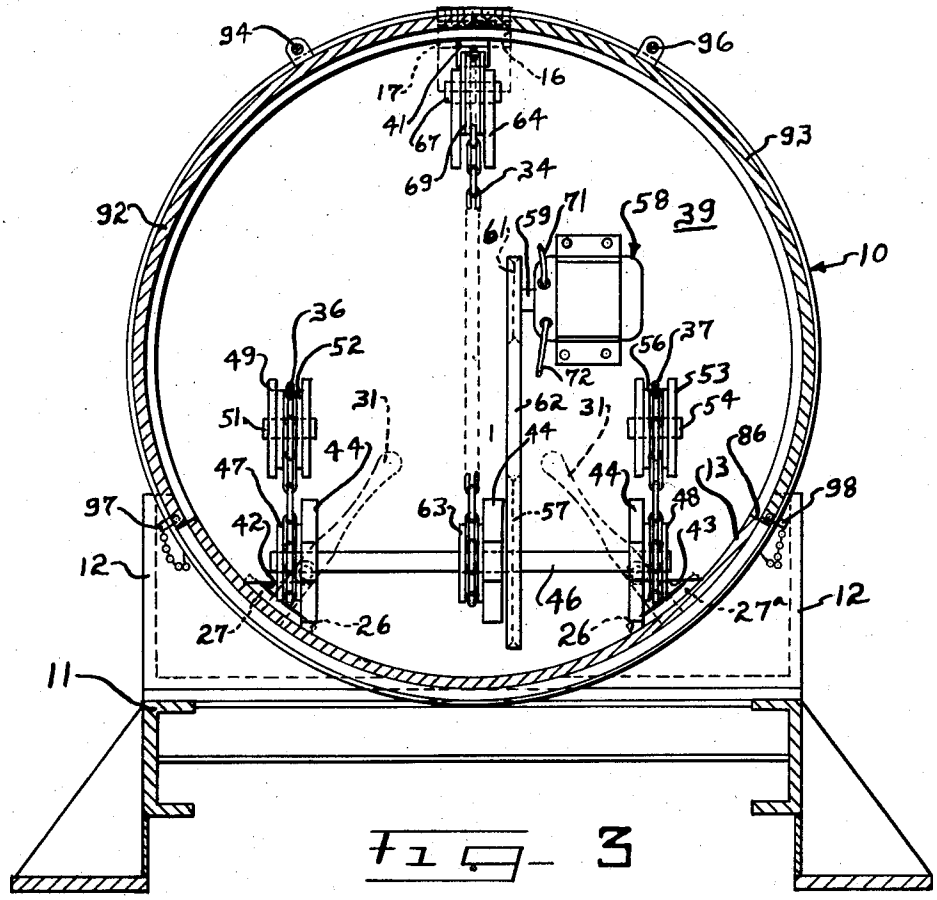


Fig. 3

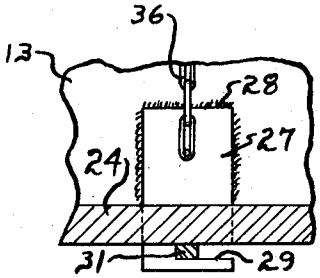


Fig. 6

Fig. 4

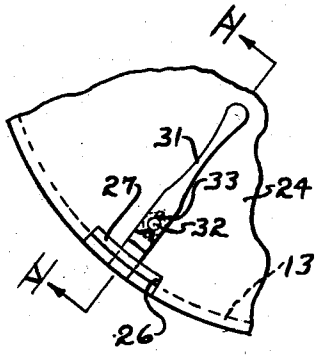
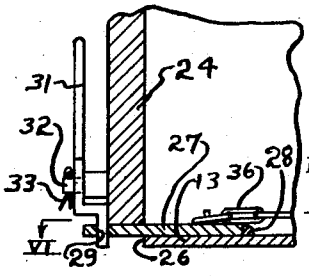


Fig. 5



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2,902,180

REFUSE VEHICLE

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10 Claims. (Cl. 214—82)

This invention relates to a refuse vehicle of the type which compresses and transports refuse, such as garbage and the like, therein.

An object of my invention is to provide a refuse vehicle of the character designated which shall include an improved power transmission means which connects a movable compressor plate to the closure member for the vehicle, whereby the forces exerted by the compressor plate and the closure member upon each other to move the compressor plate toward the closure member are substantially equal in magnitude and opposite in direction.

Another object of my invention is to provide a refuse vehicle of the character designated in which the power transmission means for moving the compressor plate toward the closure member for the vehicle connects the compressor plate to the closure member whereby no forces are required to be transferred through the chassis, or framework of the vehicle or the body for receiving the refuse, thus permitting the body for receiving the refuse to be formed of relatively thin sheet material or the like.

A further object of my invention is to provide a refuse vehicle of the character designated in which the power propelling means for moving the compressor plate toward and from the closure member is carried by the compressor plate.

A further object of my invention is to provide a refuse vehicle of the character designated which shall be simple of construction, economical of manufacture, and one which places a minimum of strain on both the vehicle body and the closed body for receiving the refuse.

Apparatus embodying features of my invention is illustrated in the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a vertical sectional view through the refuse body and showing the manner in which the refuse body is mounted on a supporting vehicle, the compressor plate and the means for moving the same being shown in elevation;

Fig. 2 is an enlarged, fragmental view showing the hinge connection for the closure member;

Fig. 3 is a sectional view taken generally along the line III—III of Fig. 1;

Fig. 4 is a fragmental view showing the latch means employed to hold the closure member in closed position;

Fig. 5 is a sectional view taken generally along the line V—V of Fig. 4;

Fig. 6 is a sectional view taken generally along the line VI—VI of Fig. 5;

Fig. 7 is a schematic diagram illustrating the fluid-pressure system employed to move the compressor plate longitudinally of the refuse body;

Fig. 8 is a schematic view showing the valve in the off position; and,

Fig. 9 is a schematic view showing the valve in position to cause the fluid to flow to the motor in a reverse direction from that shown in Fig. 7.

Referring now to the drawings for a better understanding of my invention, I show a refuse body 10 adapted to be mounted on a vehicle 11. Preferably, the refuse body 10 is in the form of an elongated tubular member which is held in place on the framework of vehicle 11 by suitable saddle members 12 which are positioned at opposite sides of the body 10, as shown in Figs. 1 and 3. The saddle members 12 are provided with curved inner surfaces which correspond generally to the curvature of the cylindrical body 10 as shown in Fig. 3. The cylindrical sidewalls for the body 10, indicated at 13, are formed of relatively thin sheet metal. The forward end of the cylindrical body 10 is closed by a front wall 14, as shown in Fig. 1.

The upper rear portion of the body 10 is cut away to provide a rectangular opening 16. Fitting within the opening 16 and secured rigidly thereto, such as by welding, is a bracket 17 which is substantially thicker than the sidewalls 13 of the body. Secured to the bracket 17 as by welding at 18 is an element 19 of a hinge 21. The other element 22 of the hinge 21 is secured as by welding at 23 to an outwardly-opening closure member 24. As shown in Fig. 1, the closure member 24 is made of a relatively heavy piece of metal which is substantially thicker than the sidewalls 13 of the body 10.

Outwardly and downwardly opening slots 26 are provided adjacent the lower end of the closure member 24 for receiving rearwardly-projecting brackets 27 and 27*a* which are secured to the inner surface of the cylindrical sidewall 13, as by welding at 28, as shown in Figs. 5 and 6. The brackets 27 and 27*a* project outwardly of the closure member 24 and a laterally-opening slot 29 is provided in the portion of the brackets 27 and 27*a*, which extends outwardly of the closure member 24 for receiving the lower end of a latch member 31. The latch member 31 is pivotally connected to the closure member 24 by means of a pivot pin 32 and is secured in place by a suitable cotter key 33. Preferably, the pivot pin 32 is provided with a reduced outer end for receiving the latch member 31 whereby the latch member is held in spaced relation to the outer surface of the closure member 24. The lower end of the latch member extends inwardly and then downwardly whereby the lower end thereof extends substantially parallel to the closure member 24 and is in position to engage the lateral slot 29 provided in the brackets 27 and 27*a*.

Secured to the brackets 17, 27, and 27*a* are sprocket chains 34, 36 and 37, respectively. The other or forward ends of the sprocket chains 34, 36, and 37 are connected to suitable brackets 38 mounted on the forward wall 14, as shown in Fig. 1.

Mounted for longitudinal movement within the cylindrical body member 10 is a transverse compressor plate 39 for compressing refuse, such as garbage and the like, within the space defined between the compressor plate and the closure member 24. The periphery of the compressor plate 39 corresponds generally to the internal contour of the body 10 whereby there is a sliding fit between the compressor plate and the internal surface of the body 10. Suitable openings 41, 42 and 43 are provided adjacent the periphery of the compressor plate 39 for passing the sprocket chains 34, 36 and 37, respectively, as shown in Fig. 3.

Mounted on the forward side of the compressor plate 39 are forwardly extending bearing brackets 44 for rotatably supporting a transverse shaft 46. Mounted adjacent opposite ends of the shaft 46 are sprockets 47 and 48 for engaging the sprocket chains 36 and 37, respectively, Mounted on the transverse compressor plate 39 above the sprocket 47 are forwardly extending bearing brackets 49 for rotatably supporting a shaft 51 for a sprocket 52, as shown in Fig. 3, whereby the sprocket chain 36, secured at its forward end to a bracket 38, extends rear-

ward and passes over the sprocket 52 and then downwardly beneath the sprocket 47 and in turn is connected to the bracket 27. Mounted on the compressor plate 39 above the sprocket 48 are forwardly extending bearing brackets 53 for rotatably supporting a shaft 54 for a sprocket 56. The sprocket chain 37 secured at its forward end to a bracket 38 extends rearwardly over the sprocket 56 then downwardly beneath the sprocket 48 and in turn is connected to the bracket 27*a*, as shown. Mounted on the shaft 46 intermediate the sprockets 47 and 48 is a pulley 57. Mounted on the transverse compressor plate 39 above the shaft 46 is a power unit, such as a fluid pressure operated motor 58, having a drive shaft 59. Mounted on the drive shaft 59 is a pulley 61 which is operatively connected to the pulley 57 by a belt 62.

Mounted on the shaft 46, as shown in Fig. 3, is a sprocket 63 and mounted on the compressor plate 39 above the sprocket 63 are forwardly extending bearing brackets 64 for rotatably supporting transverse shafts 66 and 67, the shaft 66 being nearer the compressor plate 39. Mounted on the shafts 66 and 67 are sprockets 68 and 69, respectively. The sprocket chain 34 connected at its forward end to a bracket 38 extends rearwardly over the sprocket 69 then downwardly under the sprocket 63 and thence upwardly over sprocket 68 to the bracket 17.

Fluid is supplied to the fluid pressure operated motor 58 by suitable conduits 71 and 72. The conduits 71 and 72 are formed of a flexible material and extend forwardly from the motor 58 to a reel 73 which is provided with a suitable spring, not shown, which applies a constant tension on the conduits whereby upon forward movement of the compressor plate 39 and the motor 58, the conduits are wound about the reel 73. On the other hand, when the compressor plate and motor 58 are moved rearwardly, the conduits are unwound from the reel 73 thus applying tension to the spring. In view of the fact that such tension means for reels is well known in the art, no further detailed description is deemed necessary.

The lines 71 and 72 are connected to a suitable control valve 74, as shown in Figs. 7, 8, and 9. Fluid under pressure is supplied to the valve 74 by a conduit 76 which is connected to a fluid pressure pump 77. The pump 77 is in communication with a reservoir 78 by a conduit 79. The reservoir 78 is connected to the control valve 74 by conduits 81 and 82 and the conduit 82 is provided with a suitable check valve 80 therein which permits the fluid to flow only toward the reservoir 78.

With the valve 74 in the position shown in Fig. 7, the fluid under pressure passes from pump 77, through conduit 76, valve 74, conduit 71, motor 58, conduit 72, and then back through the valve 74, as shown, to conduit 82 and the reservoir 78.

To stop the motor 58, the control valve 74 is moved to the position shown in Fig. 8 whereupon the fluid under pressure passes from pump 77, conduit 76, through valve 74 and then back to the reservoir 78 through conduit 81, as shown.

To cause the motor 58 to rotate in the opposite direction from that shown in Fig. 7, the valve 74 is rotated 90° in a clockwise direction from the position shown in Fig. 7. In this position, the fluid under pressure passes from the pump 77, through conduit 76, valve 74, conduit 72, motor 58, conduit 71 and then back through the valve 74 to conduit 81, whereupon the fluid is returned to the reservoir 78.

The pump 77 is propelled by any suitable means, such as by a drive connection indicated generally at 83, which is operatively connected to the power unit for the vehicle 11, in a manner well understood in the art. The valve 74 may be actuated by any suitable means such as by a handle 84.

An access opening 86 is provided adjacent the forward end of the body 10 for receiving refuse, such as garbage or the like. Mounted at opposite sides of the opening 86 are annular angle members 87 and 88 having inturned legs 89 and 91, respectively, as clearly shown in Fig. 1. Mounted for sliding movement at opposite sides of the body 10 are side doors 92 and 93 having suitable operating handles 94 and 96, respectively. The doors 92 and 93 are arcuate in shape whereby they are adapted to slide downwardly around the adjacent surface of the side walls 13 of the body 10 to lowered or opened position. Suitable pins 97 and 98 are adapted to extend through the leg 89 and 91 and the adjacent or lower portion of the doors 92 and 93 whereby the doors are locked in raised position when refuse is not being loaded into the body. To open either of the doors 92 and 93, the pin 97 or 98, as the case may be, is removed, whereupon the door is adapted to slide downwardly and inwardly beneath the body 10.

From the foregoing description, the operation of my improved refuse body will be readily understood. To load the body with refuse, such as garbage or the like, the compressor plate 39 is moved forwardly of the access opening 86 whereby the refuse is introduced between the compressor plate and the closure member 24. To introduce the refuse, one or both of the doors 92 or 93 is opened by releasing the pin 97 or 98, as the case may be. That is, if the refuse is to be loaded from the left side, as viewed in Fig. 3, the door 92 would be opened. On the other hand, the door 93 would be opened to load refuse from the other side of the vehicle. After the refuse is loaded, the valve 74 is moved to the position shown in Fig. 7 whereby the motor 58 drives the shaft 46 and in turn the sprockets 47, 48 and 63 in a direction to move the compressor plate toward the closure member 24 whereby the forces exerted by the compressor plate 39 and the closure member 24 upon each other are substantially equal in magnitude and opposite in direction. After the refuse is compressed, the compressor plate 39 is returned to a position forward of the access opening 86 by turning the valve 74 to the position shown in Fig. 9, whereupon the motor 58 rotates in a direction to move the compressor plate 39 forwardly of the body 10. It will be noted, that as the sprockets 47, 48, and 63 rotate in a direction to move the compressor plate 39 rearwardly toward the closure member 24, there is no strain on the framework of the vehicle. All of the stress being applied directly between the compressor plate 39 and the closure member 24. Accordingly, the only force exerted against the relatively thin body 10 is the outward force exerted by the compressed refuse. The compressor plate 39 is moved forwardly of the access opening 86 each time the refuse is loaded and is then moved rearwardly to compress the refuse until the body 10 is completely loaded.

To unload the refuse, the latch members 31 are moved in a direction to disengage the same from the lateral notches 29 provided in the brackets 27 and 27*a*, thus permitting the closure member 24 to move rearwardly about the hinge 21. With the closure member 24 thus unlatched, the motor 58 is driven in a direction to cause the compressor plate 39 to move rearwardly whereupon the refuse is pushed outwardly of the body 10.

From the foregoing description, it will be seen that I have devised an improved refuse body which may be formed of relatively thin sheet material and yet is adapted to compress the refuse without placing any stress upon the relatively thin body with the exception of the outwardly force exerted by the compressed refuse. That is, the forces exerted by the compressor plate and the closure member upon each other to move the compressor plate toward the closure member are substantially equal in magnitude and opposite in direction, all of the force being applied directly between the compressor plate 39 and the closure member 24.

While I have shown my invention in but one form, it

will be obvious to those skilled in the art that it is not so limited but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. In a refuse body adapted to be mounted upon a vehicle, a closed body having at least one access opening adjacent one end thereof for loading refuse, a closure member at the other end of said body, a transverse compressor plate mounted for longitudinal movement within said body for compressing refuse loaded through said access opening against said closure member, and power actuated means operatively connecting said compressor plate to said closure member when said closure member is in closed position for moving said compressor plate toward said closure member whereby the forces exerted by the compressor plate and the closure member upon each other to move the compressor plate toward the closure member are substantially equal in magnitude and opposite in direction.

2. In a refuse body adapted to be mounted upon a vehicle, a closed cylindrical body formed of a relatively thin material and having at least one access opening adjacent one end thereof for loading refuse, an outwardly opening closure member hingedly mounted adjacent its upper end to the other end of said body, releasable latch means connecting the lower end of said closure member to said body, a transverse compressor plate mounted for longitudinal movement within said body for compressing refuse loaded through said access opening against said closure member, and power actuated means operatively connecting said compressor plate to said closure member when said closure member is in closed position for moving said compressor plate toward said closure member whereby the forces exerted by the compressor plate and the closure member upon each other to move the compressor plate toward the closure member are substantially equal in magnitude and opposite in direction.

3. A refuse body adapted to be mounted upon a vehicle, a closed body having at least one access opening adjacent one end thereof for loading refuse, a closure member at the other end of said body, a transverse compressor plate mounted for longitudinal movement within said body for compressing refuse loaded through said access opening against said closure member, at least one sprocket chain adapted to be operatively connected at one end to said closure member when said closure member is in closed position and at its other end to the opposite end of said body, a sprocket mounted for rotation on said compressor plate and disposed to engage said chain whereby said compressor plate is moved longitudinally of said body in response to rotation of said sprocket, and power drive means operatively connected to said sprocket for rotating the same whereby the forces exerted by the compressor plate and the closure member upon each other to move the compressor plate toward the closure member are substantially equal in magnitude and opposite in direction.

4. A refuse body as defined in claim 3 in which the power drive means is carried by the compressor plate.

5. A refuse body adapted to be mounted upon a vehicle, a closed body having at least one access opening adjacent one end thereof for loading refuse, a closure member at the other end of said body, a transverse compressor plate mounted for longitudinal movement within said body for compressing refuse loaded through said access opening against said closure member, a plurality of sprocket chains adapted to be operatively connected at one of their ends to said closure member when said closure member is in closed position and at the other ends thereof to the opposite end of said body, sprockets mounted for rotation on said compressor plate and disposed to engage said chains whereby said compressor plate is moved longitudinally of said body in response to rotation of said sprockets, and power drive means carried by said compressor plate and operatively connected to said sprockets for rotating the same whereby the forces exerted by the compressor plate and the closure member upon each other to move the compressor plate toward the closure member are substantially equal in magnitude and opposite in direction.

6. A refuse body adapted to be mounted upon a vehicle, a closed body having at least one access opening adjacent one end thereof for loading refuse, a closure member at the other end of said body, a transverse compressor plate mounted for longitudinal movement within said body for compressing refuse loaded through said access opening against said closure member, a transverse shaft mounted for rotation adjacent the lower end of said compressor plate, sprockets mounted for rotation adjacent each end of said shaft, a third sprocket mounted for rotation adjacent the top of said compressor plate, sprocket chains operatively engaging said sprockets and adapted to be operatively connected at one of their ends to said closure member when said closure member is in closed position and at the other ends thereof to the opposite end of said body whereby said compressor plate is moved longitudinally of said body in response to rotation of said sprockets, and power drive means carried by said compressor plate and operatively connected to said sprockets for rotation of the same whereby the forces exerted by the compressor plate and the closure member upon each other to move the compressor plate toward the closure member are substantially equal in magnitude and opposite in direction.

7. A refuse body as defined in claim 6 in which the power drive means is operatively connected to the transverse shaft for rotating the same and a sprocket is mounted on said shaft adjacent the longitudinal center thereof for engaging the sprocket chain which passes over said third sprocket which is mounted for rotation adjacent the top of the compressor plate.

8. A refuse body as defined in claim 7 in which another sprocket is mounted adjacent said third sprocket on the side thereof toward the end of the body opposite the closure member whereby the sprocket chain passing over said third sprocket passes under the sprocket mounted adjacent the longitudinal center of the shaft and then upwardly over said another sprocket.

9. A refuse body adapted to be mounted on a vehicle, a closed body having at least one access opening adjacent one end thereof for loading refuse, a closure member at the other end of said body, a transverse compressor plate mounted for longitudinal movement within said body for compressing refuse loaded through said access opening against said closure member, at least one sprocket chain adapted to be operatively connected at one end to said closure member when said closure member is in closed position and at its other end to the opposite end of said body, a sprocket mounted for rotation on said compressor plate and disposed to engage said chain whereby said compressor plate is moved longitudinally of said body in response to rotation of said sprocket, and fluid pressure operated means carried by said compressor plate and operatively connected to said sprocket for rotating the same whereby the forces exerted by the compressor plate and the closure member upon each other to move the compressor plate toward the closure member are substantially equal in magnitude and opposite in direction.

10. A refuse body as defined in claim 9 in which fluid under pressure is supplied to said fluid pressure actuated means by a flexible conduit which is wound about a reel mounted adjacent the end of said body opposite said closure member.

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