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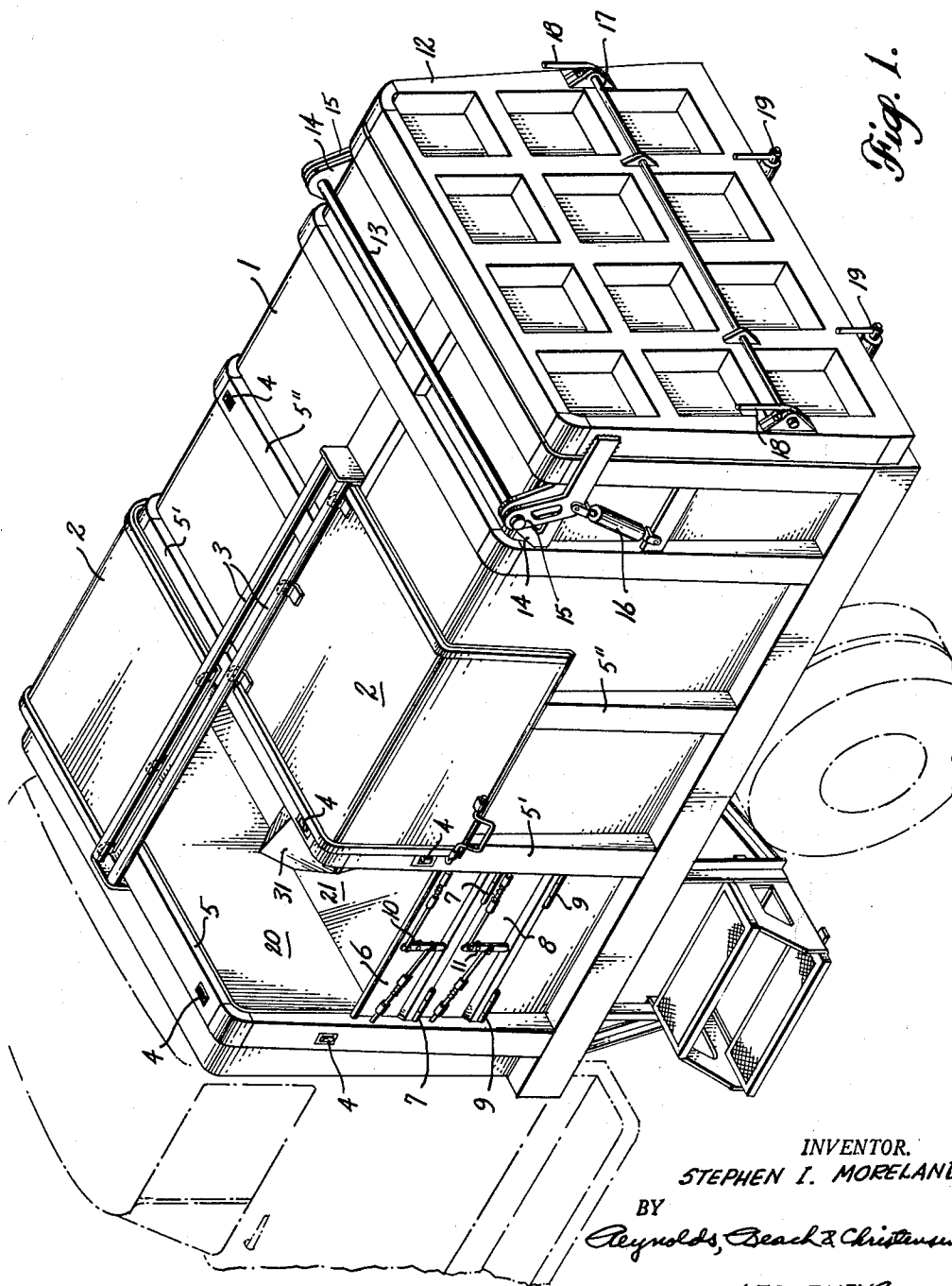
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GARBAGE TRUCK PACKING BLADE ACTUATION

Filed Nov. 18, 1959

3 Sheets-Sheet 1



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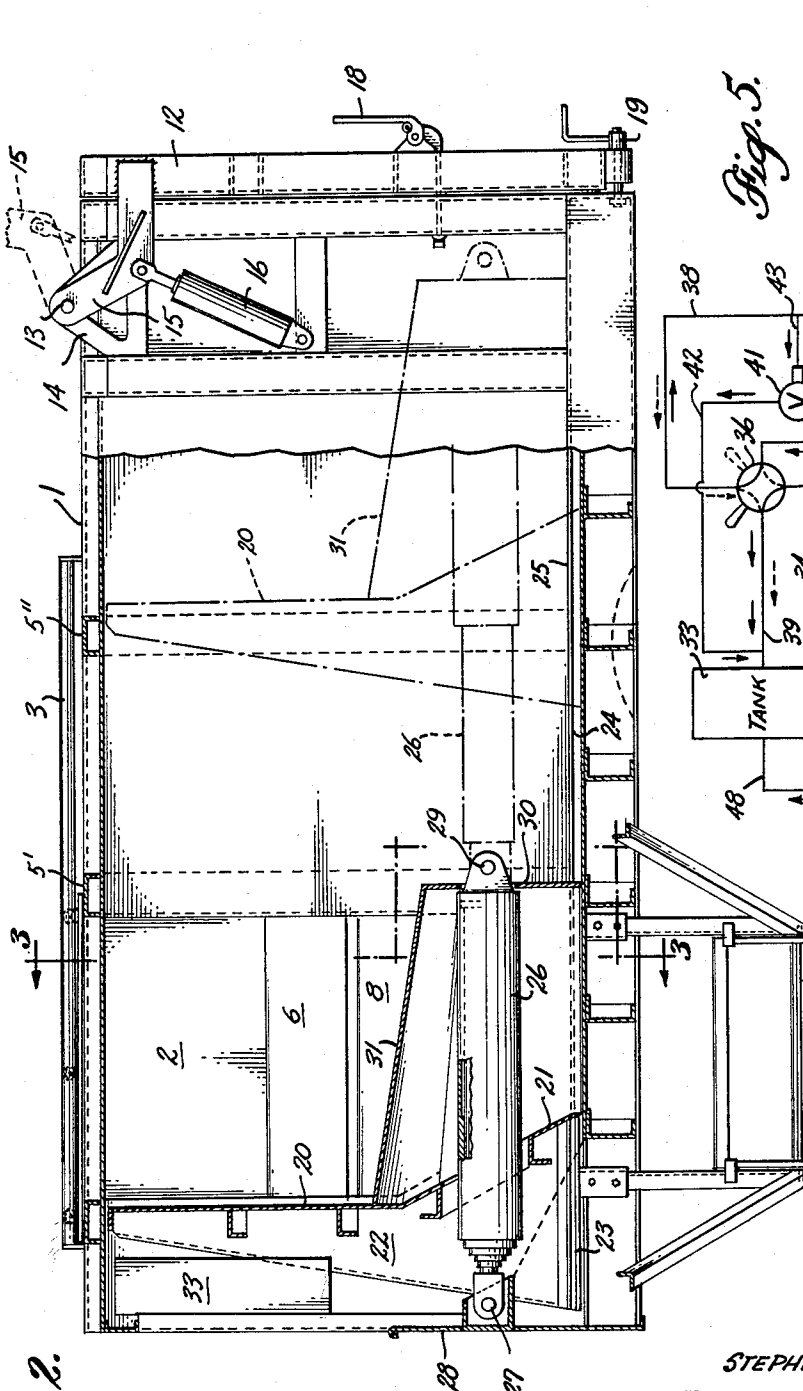


Fig. 2.

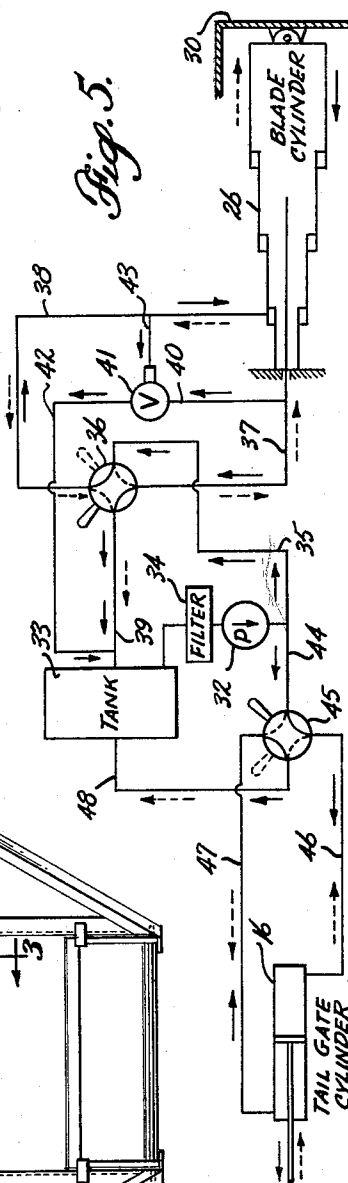


Fig. 5.

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Fig. 3.

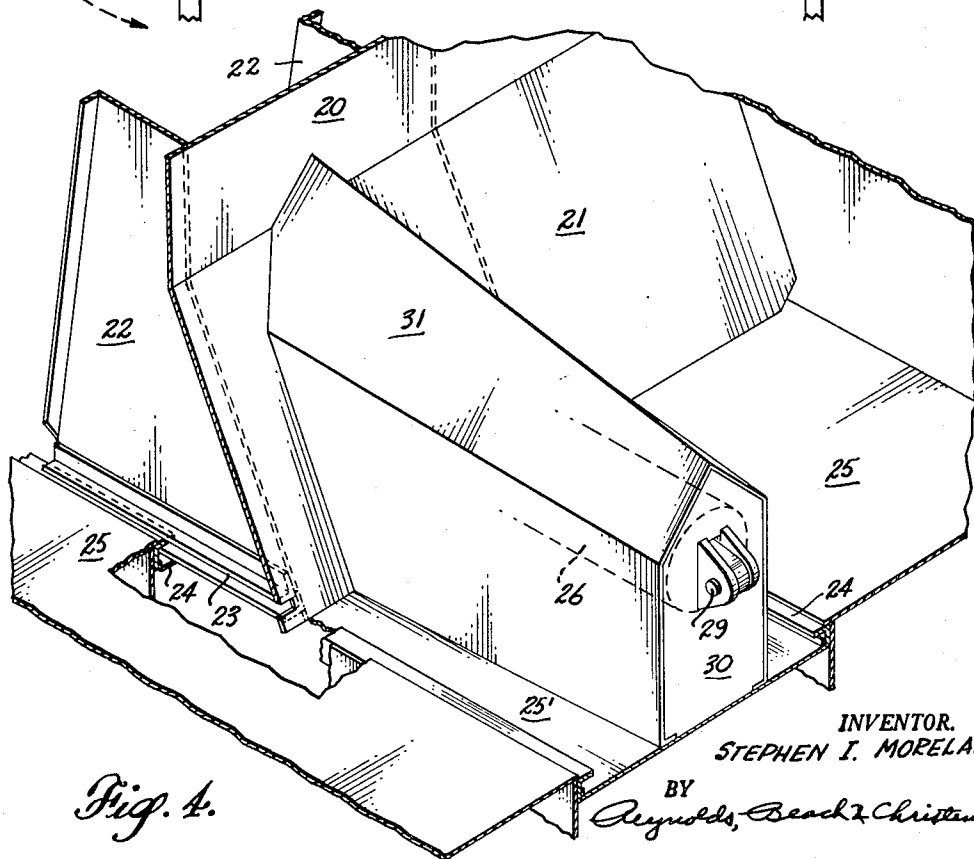
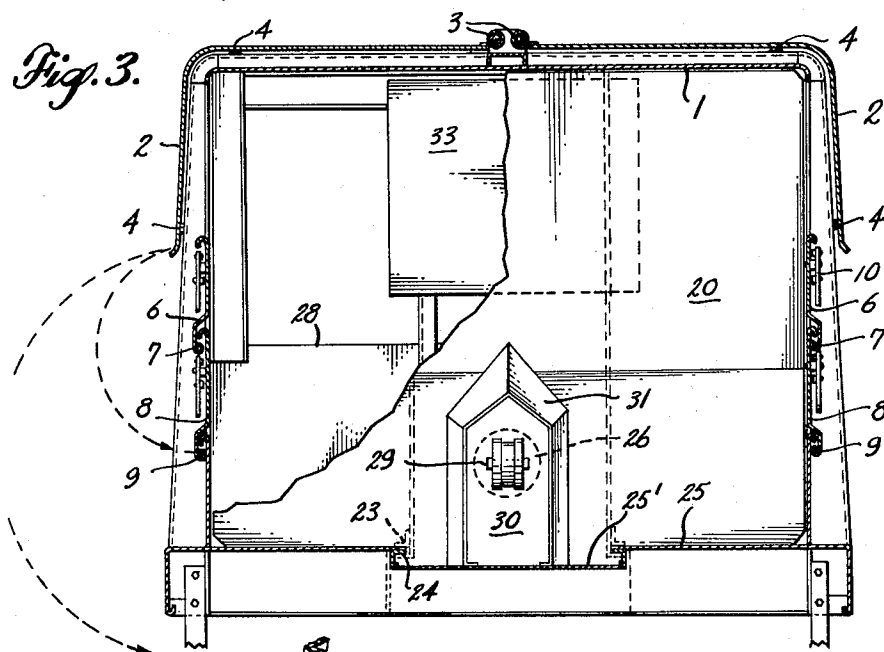


Fig. 4.

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GARBAGE TRUCK PACKING BLADE ACTUATION

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2 Claims. (Cl. 214—82)

This invention relates to a garbage truck of the type having a tank body in which a packing blade is reciprocally mounted and is particularly concerned with the blade mounting structure and blade moving mechanism.

A principal object of the present invention is to utilize a fluid pressure actuator for moving the packing blade within the body of the truck and to locate such actuator so that it will operate most effectively in moving the packing blade. Specifically such actuator is disposed so that it will exert the most effective thrust in all positions of the packing blade for packing garbage in the body and further can be actuated to return from a packing movement much more rapidly than it moves during such packing movement.

It is also an object to provide mounting structure for such a garbage packing blade which will support the blade in stable fashion during the garbage packing action and which is coordinated with the blade actuating mechanism so as to reduce the friction of blade movement as far as possible consistent with simplification of design and economy of manufacture.

It is also an object of the present invention to provide the advantages mentioned above in a garbage truck packing blade construction without appreciably reducing the capacity of the truck body or the ability of the blade to pack the garbage in the body effectively and to accomplish unloading of the garbage from the body when it is to be dumped.

In general the objects discussed above can be accomplished by mounting a packing blade in a tank type garbage truck body in an upright position extending transversely of the fore and aft length of the body. Such blade is supported by a slide and guide arrangement at its base extending over a substantial distance fore and aft to resist tilting of the blade under the force resisting its movement encountered during a packing operation. Movement of the blade is effected by a telescoping section fluid piston and cylinder blade actuator disposed in substantially horizontal position near the bottom of the blade and disposed with its length extending fore-and-aft of the truck. Such actuator is disposed substantially parallel to the direction of movement of the blade and is mounted within an actuator housing carried by and projecting rearwardly from the blade so as to enable an actuator of substantial length to be used without appreciably limiting the forward travel of the blade.

FIGURE 1 is a top perspective view of the garbage truck body and FIGURE 2 is a side elevation view of such body with parts broken away to reveal internal structure.

FIGURE 3 is a vertical transverse sectional view through the body taken on line 3—3 of FIGURE 2, having parts broken away.

FIGURE 4 is an enlarged top perspective view of the lower portion of the packing blade and the adjacent parts of the truck body with parts broken away.

FIGURE 5 is a diagram of the fluid actuating system for the packing blade and the truck body tail gate.

As shown best in FIGURES 1 and 3, the tank type garbage truck body 1 is preferably of generally rectangular cross section to provide as much capacity as possible. It is intended that the garbage be loaded into the front portion of the body and discharged from its aft end.

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A suitable opening may be provided in the front portion of the body which can be closed by covers 2 of generally angular shape. Two of such covers are shown, each including a roof portion extending from a location adjacent to the center of the body outward and joined to a side-wall portion extending from the roof portion downward. Such covers are guided for fore-and-aft sliding movement by hangers mounted on the inner edge of each cover and slidably received in tubular tracks 3. The body of the cover in each instance may engage and slide on rollers 4 mounted in the body frames 5 and 5' at opposite sides of the garbage receiving opening and in the further frame 5" spaced from such opening. These covers can swing upward at least to a limited extent to facilitate their sliding movement.

To increase the access opening to the interior of the truck body it may be desirable to provide an additional door or doors below the covers 2 and between the frame members 5 and 5'. Such a door 6 is shown mounted by hinges 7 at its lower edge to swing downward in the manner indicated in broken lines in FIGURE 3. If access opening in addition to that provided by the door 6 is desired, it will be preferable to provide a second door 8 rather than simply increasing the width of the upper door 6 to facilitate manipulation of the doors. In such event the hinges 7 mounting the upper door will be carried on the upper swinging edge of the lower door 8 which in turn is mounted by hinges 9 at its lower edge. The upper door can be secured in closed position by lever latch mechanism 10 engaging with the frames 5 and 5' and the lower door can be secured in position by the lever latch mechanism 11 also engaging in such frame members. By disengaging the latch 10, the upper door 6 can be swung downward and after disengaging latch 11 also, both doors can be swung downward conjointly, in which event the upper swinging edge of door 6 will trace the path illustrated by the larger broken line arc shown in FIGURE 3.

The aft end of the body 1 can be closed by the tail gate 12 which is mounted for upward swinging of its lower edge. On the opposite ends of the tail gate supporting axle 13 mounted on the truck body by brackets 14 are received arms 15 having their swinging ends welded or otherwise suitably secured to the opposite upright edges of the tail gate 12, respectively. Such tail gate can be swung between the closed position shown in FIGURE 1 and FIGURE 2 and an upwardly swung open position by a piston-and-cylinder fluid pressure actuator 16. This actuator extends between the body and one of the arms 15 and can be extended from the full-line position shown in FIGURES 1 and 2 into the broken-line position shown in FIGURE 2 for swinging the tail gate upward into its open position. When the tail gate is in its lowered, closed position it can be held in such position by latch mechanism at its opposite sides interconnected by shaft 17. Such latch mechanism can be actuated by manipulation of handles 18. Supplemental lower latches 19 in the form of swingable latch fingers can be provided to engage and restrain the lower edge of the tail gate. The arms 15 and such latches cooperate to prevent the tail gate from being forced open by the great pressure exerted on its inner side by the garbage during a packing operation.

Packing of garbage within the body 1 and discharge of the garbage from such body is effected by fore-and-aft reciprocating movement of the packing blade 20. Such blade is disposed in upright position in the truck body extending transversely of its fore-and-aft length. Preferably the lower portion 21 of such blade is downwardly and rearwardly inclined so that as the blade is moved rearwardly such inclined portion exerts a lifting force on the garbage in opposition to the force of gravity tending to concentrate the bulk of the garbage in the bottom of

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the body. The blade is mounted on and strengthened by two parallel upright stiffening webs 22 disposed in fore-and-aft planes at the central portion of the blade as shown in FIGURES 3 and 4. The lower edges of such stiffeners are mounted by slide and guide mechanism composed of the channel slides 23 extending fore-and-aft along the lower edges of the stiffeners 22 and fitted with the channel guides 24 shown in FIGURES 3 and 4. The slide elements 23 are of a sufficient length fore-and-aft to prevent appreciable tilting of the stiffeners 22, and consequently of the packing blade 20, by forces exerted on the blade by the blade actuator and the forces resisting movement of the blade produced by the garbage being packed. Because of the slide and guide arrangement for the packing blade described, the floor of the truck body is composed of two side sections 25 disposed in a common plane and a central portion 25' between the guides 24 which is depressed somewhat below the opposite side portions of the floor.

The garbage packing blade 20 is moved fore-and-aft by the fluid pressure piston-and-cylinder actuator 26. In order to enable such actuator to move the blade 20 through a sufficient distance fore-and-aft without being undesirably long in its contracted position, it is preferred that such actuator include a plurality of telescoping sections, six such sections being shown in FIGURE 2. It will be understood, however, that the number of sections utilized may be varied in accordance with the preference of the designer. Also, while it is preferred for both the fluid pressure actuator 26 and the actuator 16 to be of the hydraulic type, such actuators could, if desired, be of the pneumatic type.

Whatever type of fluid pressure actuator 26 is employed, it is an important feature of the present invention to dispose it in substantially horizontal position extending fore-and-aft generally parallel to the direction of movement of the packing blade 20. Moreover, as shown in FIGURE 2, it is preferred that such actuator be located at the lower portion of the packing blade. By such disposition of the actuator, its sections will move through substantially parallel positions during extension and retraction movement without appreciable swinging of the actuator, as shown in the solid and broken lines in FIGURE 2. To avoid the need of precision mounting, however, it is preferred that the stationary end of the actuator be mounted on a pivot 27 carried by the end wall 28 of the body 1 and that the movable end of the actuator be mounted by a pivot 29 on the end wall 30 of the actuator housing. Such housing includes a side wall 31 having its forward edge secured to the blade so that the entire actuator housing 30, 31 is carried by the blade for fore-and-aft movement with it. As will be seen from the illustration of FIGURES 3 and 4, however, the housing is comparatively small in cross section so that despite its rearward projection from the blade for a considerable distance it does not appreciably reduce the capacity of the garbage truck body. Such disposition of the actuator does, however, enable it to exert a force substantially parallel to the direction of movement of the packing blade so that such force is exerted on the blade in most direct opposition to the resisting force of the garbage being packed.

By locating the actuator 26 at the lower portion of the blade, the blade-moving force does not tend to tilt the blade appreciably and consequently does not produce any substantial increase in the friction of the slide and guide mechanism resisting movement of the blade. Moreover, in packing the garbage the center of resistance caused by the packing action will be at or slightly below the center of the blade while the frictional resistance to movement of the blade caused by the slide and guide mechanism will be at the bottom of the blade. By locating the actuator 26 generally centrally between the locations of these forces opposing motion of the blade, the lever arms of the forces effecting and resisting blade movement will be approximately balanced so that the tendency of the blade to be tilted will be minimized and the friction between the slide

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and guide members will accordingly be reduced as much as possible. Accommodation of the actuator 26 in the housing 30, 31 projecting rearwardly from the blade 20 does not reduce the effectiveness of such blade in discharging garbage from the truck body when it is being dumped. The guides 25 extend substantially to the aft end of the truck body so that the inclined portion 21 of the blade can be moved rearwardly substantially to the aft end of the truck body when the tail gate 12 is in its upwardly swung, open position even though the actuator housing 30, 31 has been projected a substantial distance beyond the aft end of the body.

In operation successive quantities of garbage are dumped into the body through the forward opening and the packing blade 20, 21 is moved rearwardly to pack the garbage in the aft portion of the truck body. While the actuator housing 30, 31 limits the distance which the blade can be moved rearwardly while the tail gate 12 is closed, as indicated in broken lines in FIGURE 2, the packing blade can be moved sufficiently close to the tail gate to pack the garbage effectively in the space aft of it. After each packing operation the packing blade is moved forward again to its forward limiting position shown in FIGURES 1 and 2 and additional batches of garbage are dumped into the body through the forward loading opening and the blade again moved rearwardly until the entire body 1 is full of compacted garbage. The truck is then driven to a disposal location, the tail gate 12 is swung upward to its open position and the packing blade is then moved rearwardly again to discharge the compacted garbage. It will be evident that during such successive packing operations the packing blade should be moved rearwardly rather slowly. Upon completion of each such packing operation, however, much time can be saved if the blade is returned to its forward position at a speed much higher than that at which it travels during the packing operation. Such rapid return movement can be accomplished by utilizing the type of piping system shown diagrammatically in FIGURE 5.

The fluid pressure actuator system shown in FIGURE 5 is of the hydraulic type and includes a pressure pump 32 which supplies hydraulic liquid under pressure to the fluid actuator systems from a storage tank or reservoir 33 through a filter 34. If a pneumatic type of system were employed, an air compressor and air storage tank could be provided as an alternative source of fluid under pressure. From the pressure fluid source 32 the blade actuator pressure fluid supply line 35 extends to the blade movement control valve 36. When such valve is in the position shown in broken lines, the pressure fluid supply line 35 is connected to the internal blade actuator line 37 by which pressure fluid is supplied to the interior of the actuator, as indicated by the broken arrows, to extend the actuator. The body of valve 36 also is connected by the external blade actuator line to the spaces between the actuator sections so that, during extension movement of the actuator, fluid can be expelled through the line 38 and valve 36 to the pressure fluid return line 39 connected to the tank 33.

In order to expedite return movement of the packing blade 20, 21 to its forward position of FIGURES 1 and 2, a supplemental passage for flow of liquid from the interior of the actuator to the reservoir 33 is provided in addition to the line 37. Such supplemental line 40 is connected from the internal actuator line 37 to a normally closed control valve 41. When this valve is open liquid may flow from the line 40 through line 42 to the reservoir 33 as well as through line 37. When the control valve 36 is swung into the solid line position shown in FIGURE 5, hydraulic liquid under pressure will pass from supply line 35 to the external line 38 for effecting contraction of the actuator. The pressure of the liquid thus admitted to line 38 also will be impressed upon line 43 connected to it which feeds to the control mechanism of valve 41. The pressure exerted by the liquid supplied by

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line 43 to the valve control mechanism will effect opening movement of this valve to connect line 40 with line 42 to provide a conduit of large capacity in parallel with return passage 37, 39. Consequently, liquid may flow rapidly from the interior of the actuator 26 to the reservoir through the two paths 37, 39 and 40, 42 to expedite greatly contracting movement of the actuator and, consequently, forward return movement of the packing blade.

Pressure liquid supply pump 32 may also supply liquid under pressure to the tail gate movement control valve 45 which controls supply of pressure liquid to the tail gate piston-and-cylinder actuator 16. By placing the valve in the position shown in solid lines, liquid under pressure will be supplied to the line 46 for extending the actuator 16 and liquid will be returned from the actuator through line 47 and valve 45 to the return line 48 connected to tank 33. Movement of valve 45 to the broken line position will effect a supply of pressure liquid to line 47 for contracting actuator 16 and closing the tail gate 12 while liquid is discharged from such actuator through line 46 and valve 45 to the return line 48 connected to tank 33. It is evident that by placing valves 36 and 45 in positions between these solid and broken lines communication through these valves will be interrupted and their respective actuators 26 and 16 will be locked against movement in either direction.

I claim as my invention:

1. In a garbage truck, a packing blade, means guiding said blade for movement of said blade transversely thereof, a hydraulic piston-and-cylinder blade actuator extending transversely of said blade, a source of hydraulic liquid, first conduit means connecting said hydraulic liq-

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uid source to said actuator for extending said actuator to move said blade in the packing direction, means operatively connected to said actuator for effecting return movement of said blade in the direction opposite said packing direction, and second conduit means supplemental to said first conduit means and connected in parallel therewith receiving liquid expelled from said actuator during such return movement.

2. In a garbage truck, a packing blade, means guiding said blade for movement of said blade transversely thereof, a hydraulic piston-and-cylinder blade actuator extending transversely of said blade, a source of hydraulic liquid, conduit means connected to said actuator for supplying pressure liquid to said actuator for extending said actuator to move said blade in the packing direction, return means operatively connected to said actuator for effecting return movement of said blade in the direction opposite said packing direction, and means actuated by said return means to increase the capacity of said conduit means for receiving flow of liquid expelled from said actuator during such return movement.

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