Sept. 8, 1964 G. E. URBAN ETAL 3,147,870

CONTAINER DUMP MECHANISM

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Fig. 1.

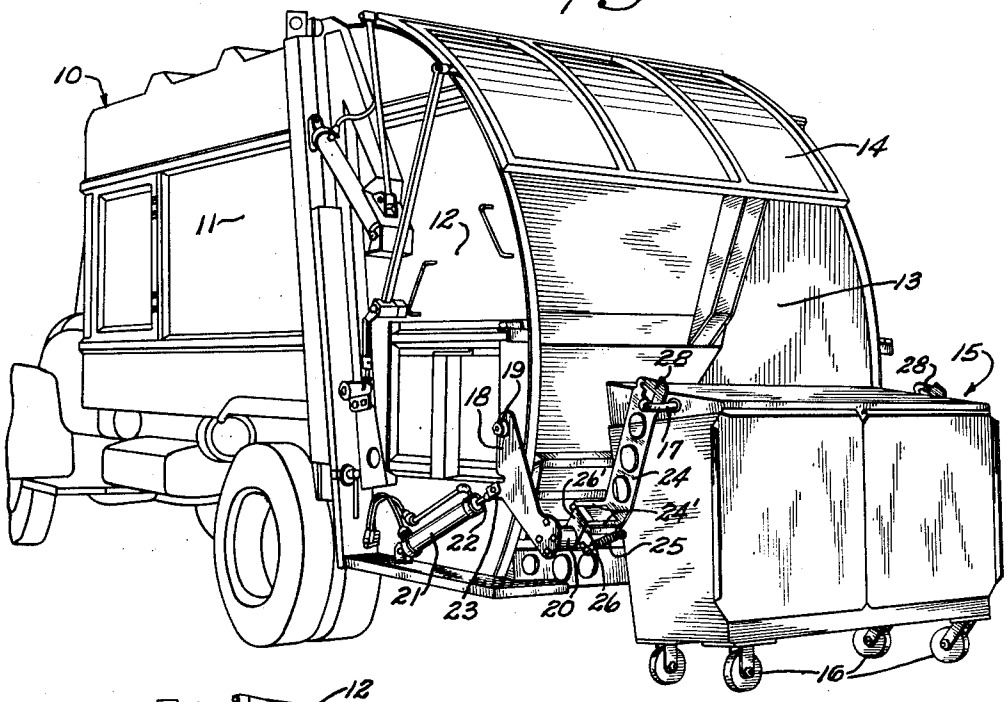
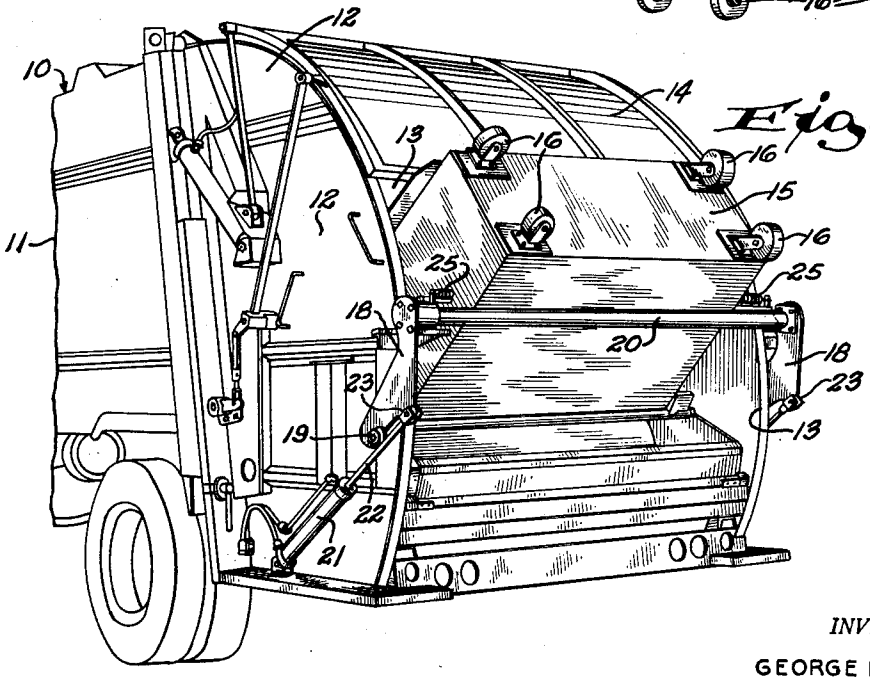


Fig. 2.



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Fig. 3.

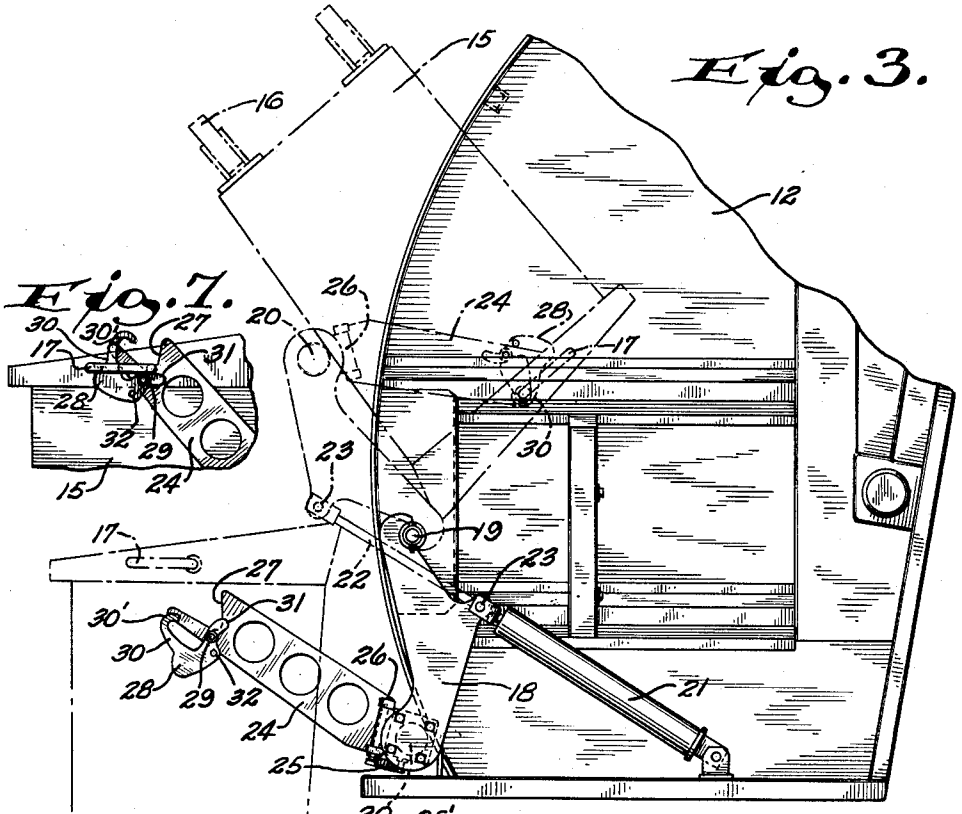


Fig. 7.

Fig. 6.

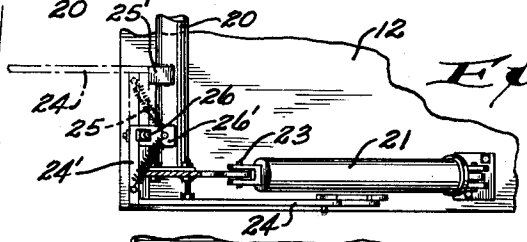


Fig. 4.

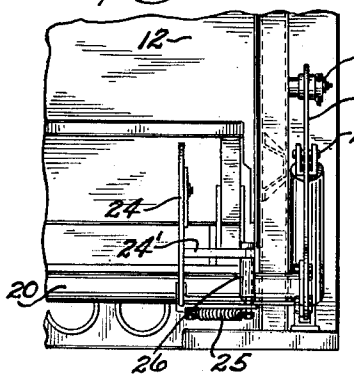
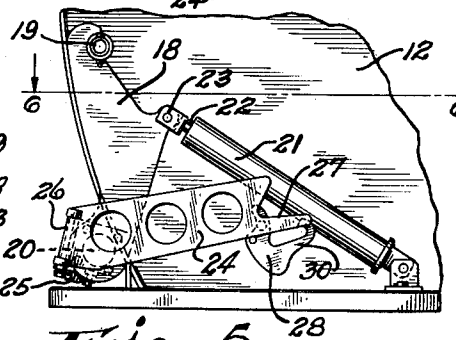


Fig. 5.



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CONTAINER DUMP MECHANISM

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This invention relates to improvements in self-loading refuse trucks, and more particularly to an improved mechanism for emptying mobile refuse containers into such trucks.

Many factories, office buildings, and similar establishments accumulate their refuse in large mobile containers which are kept in convenient locations around the building, and at certain intervals collectors pick up the accumulated refuse in trucks and haul it away to a dump or other disposal area. In order to facilitate the emptying of the relatively heavy containers into the trucks, various "self-loading" mechanisms have been developed for automatically performing that operation, such devices mechanically raising and tilting a container to cause its contents to be deposited in the truck. With such prior devices, however, it is necessary for the workmen to manually attach the individual containers to the lifting mechanism on the truck. In one system this is accomplished by means of cables or other support members, and it is necessary to disengage and remove the support members after the container has been emptied. This not only requires manual effort, but is time consuming and reduces the efficiency of the operation.

With the above in mind, the principal object of the present invention is to provide a novel loading mechanism for refuse trucks whereby a mobile container can be lifted and emptied into the truck without requiring manual attachment to the lifting members on the truck, and whereby the container is automatically disengaged from the truck after it has been emptied, thereby facilitating the job of the workmen and increasing the speed and efficiency of the loading operation.

A further object of the invention is to provide an improved loading mechanism for refuse trucks and the like wherein the mobile container to be emptied therein does not have to be accurately positioned relative to the rear of the truck as is required with conventional self-loaders.

A further object of the invention is to provide an automatic-loading mechanism for the purpose described, wherein the lifting members can be swung to an unobstructing, out-of-the-way position against the sides of the truck when the truck is in transit.

Still further objects of the present invention are to provide an improved loading mechanism for self-loading refuse trucks, and a mobile container for use therewith, which loading mechanism and container are relatively inexpensive in design and construction, reliable in operation, and otherwise unusually well suited for their intended purposes.

With the above and other objects in view, the invention consists of the improved refuse-loading mechanism, and mobile container, and all of the parts and combinations thereof as set forth in the claims, and all equivalents thereof.

In the accompanying drawings, illustrating a complete embodiment of the preferred form of the invention, and

wherein the same reference numerals designate the same parts in all of the views:

FIG. 1 is a perspective view of a refuse truck equipped with the improved loading mechanism comprising the present invention, and showing the mobile container employed therewith engaged and about to be lifted off the ground;

FIG. 2 is a fragmentary perspective view of the truck illustrated in FIG. 1 and showing the mobile container in its fully raised, emptying position;

FIG. 3 is a fragmentary side elevational view of the rear of a truck showing the improved loading mechanism mounted thereon, and showing, in dot and dash lines, first a container in its initial position before it is engaged, and, second, the container and cooperating parts when the container is in its inverted, emptying position;

FIG. 4 s a fragmentary rear elevational view of the refuse truck showing a portion of the loading mechanism;

FIG. 5 is a fragmentary side elevational view of the refuse truck showing the rear portion of the loading arm swung to its inoperative position;

FIG. 6 is a fragmentary sectional view taken along line 6—6 of FIG. 6; and

FIG. 7 is a fragmentary side elevational view of the loading assemblage showing the position of the pivoted latch as it is being moved into handle engaging position.

Referring now more particularly to the drawings, the numeral 10 designates a refuse truck of the rear-loading type, said truck including a refuse storage chamber 11 and a receiving hopper 12 at its rear end, the rear wall of the latter being curved upwardly and forwardly and having an opening 13 extending across its entire width through which the refuse is admitted. A curved, sliding door 14 is provided to close off the opening 13 when the vehicle is not being loaded.

In the use of such a truck, trash, garbage, scrap, and the like is brought to the truck in mobile containers which have been filled over a period of time, and is transferred from said containers into the receiving hopper of the truck. Means within the hopper then transfers the refuse into the storage chamber and packs the same tightly therein. The general construction and operation of such trucks is well known, and is not claimed as part of the present invention. Rather, what is new is the improved loading mechanism hereinafter described which is designed to facilitate the emptying of the mobile containers into such trucks.

With particular reference now to FIGS. 1 and 3 of the drawings, it will be seen that the invention includes a pair of hydraulic cylinders 21, having extensible rams 22, which cylinders are designed to actuate the loading mechanism, as will be seen. Said cylinders are pivotally mounted on the lower, rear portions of the opposite hopper side walls, being disposed to project upwardly and rearwardly at an angle. The rams are provided with automatic remote control means of any suitable type so that they may be operated from any convenient location.

Pivotally mounted on the hopper side walls adjacent and above said hydraulic cylinders 21 are generally L-shaped levers 18, the upper ends of which are pivotally connected to said walls as at 19, and the lower ends of which normally project downwardly and rearwardly as shown in FIG. 1. The aforementioned hydraulic rams 22 are pivotally attached to the elbows of said levers 18

as at 23, and connecting the free ends of said levers is a transverse rod or tube 20 which extends across the rear of the truck.

Secured to the transverse rod 20, adjacent said levers 18, are a pair of lifting arms 24 which, when in use, project rearwardly beyond and upwardly at an angle relative to said levers, said arms having transversely and outwardly offset lower portions 24' and being connected to projecting blocks 26' on the cross rod by hinge assemblages 26 which permit said arms to be swung or folded from their rearwardly projecting position (FIGS. 1 and 3) to a forwardly-projecting position adjacent and in general parallelism with the hopper side walls (FIGS. 5 and 6) when not in use. Springs 25 are attached between the lower portions of said lifting arms and the cross rod blocks 26' in a manner whereby said arms are yieldingly maintained in either their extended or folded positions, the springs being moved past center when the arms are swung from one position to another, and there being stop blocks 25' on the rod.

As will best be seen in FIGS. 3 and 7, the outer ends of said lifting arms 24 are provided with V-shaped cutouts or notches 27, and pivoted on the end of each of said arms adjacent said notch is a latch 28 having a short leg 31 and an elongated generally U-shaped leg 30, the latter being provided with a hook formation 30' at its outer end.

When the lifting arms 24 are in their outwardly projecting position of FIG. 3 gravity holds said pivoted latches in the position shown, with the leg portions 30 thereof in a rearwardly and upwardly inclined position, and with the short leg portions 31 thereof extending across the lower parts of said V-shaped notches 27, there being stop pins 32 on said latches which engage the arms 24 and prevent further swinging.

The mobile refuse containers employed in the present invention comprise large rectangular receptacles 15, the end walls of which are spaced apart a distance slightly less than the width of the hopper opening 13, and which containers are usually of at least a one yard capacity. Said containers are provided with swivel caster wheels 16, and as will be seen in FIG. 1, horizontally disposed, U-shaped handles 17 are attached to the end walls adjacent the top, said handles not only facilitating the movement of the wheeled containers from place to place, but providing an important element in the lifting and dumping operation, as will now be described.

Operation

In the use of the mechanism comprising the present invention, a mobile refuse container 15 of the type described is first wheeled into a position between the lifting arms 24, while the latter are projecting rearwardly of the truck, as described. The hydraulic rams 22 are then actuated, and as said rams move upwardly and rearwardly they cause the levers 18 and attached lifting arms 24 to swing upwardly in an arc about their aligned pivot points 19, from the full line position of FIG. 3 to the dot and dash line position therein. During the start of such movement, as the outer ends of said lifting arms reach the handles 17 on the container, the leading portions of said handles are received within the V-shaped notches 27 in the ends of said arms. As will be appreciated, as the arms continue to move upwardly, with the container handles engaged within said notches, a wedge action is provided by the inclined surfaces of the notches which automatically moves the mobile container forwardly or rearwardly somewhat, as required, and insures that said container is properly aligned.

As the lifting arms 24 continue their upward travel, the forward portions of the container handles, which are positioned within the V-shaped arm notches 27, engage the latch short legs 31, as in FIG. 7, and force the same downwardly about their pivot points 29, simultaneously raising the U-shaped leg portions 30 of said latches to partially close said V notches 27. When the handles 17 abut the bottoms of the V-shaped notches, further upward movement of said arms causes the container to be lifted off the ground and raised in an arc about the pivot points 19, as shown in FIG. 3, the weight of the container maintaining the handles 17 within the V notches 27. After the mobile container has reached a certain stage in its arcuate path, the cross rod 20 engages the front wall of the container as shown by the dot and dash lines in FIG. 3 and begins to function both as an aid in lifting said container, causing it to be gradually tilted forwardly until it reaches the substantially inverted dumping position illustrated in FIGS. 2 and 3.

During such movement, when the lifting arms reach the point during their travel where the U-shaped latch legs 30 pass their center of gravity, said legs fall forwardly and downwardly to the dot and dash line position of FIG. 3 to complete the closing of the V notches, the hook formations 30' on the ends of the latches engaging about the forward portions of the handles 17. Consequently, when the lifting arms reach the stage where they are substantially horizontal as in dot and dash line position of FIG. 3, and where the container would otherwise slide out of the V-shaped arm notches 27, said latches are firmly hooked around the container handles and prevent the disengagement of said container.

After the contents of the container have fallen into the hopper, the operation of the hydraulic cylinders 21 is reversed and the arms 24 begin swinging rearwardly and downwardly about their pivot points 19 to return the container to its initial position on the ground. When the container reaches a certain point in its downward travel, the hooked legs 30 of the pivoted latches are caused by gravity to fall rearwardly and out of confining engagement with the container handles, thus partially opening the V-shaped arm notches, but by that time the arms 24 have reached a position where the handles are again retained within the V notches by the weight of the container as the notches now open upwardly. When the container reaches contact with the ground, as in the lower position of FIG. 3, the lifting arms 24 are designed to continue downwardly a short distance as illustrated, and because gravity has caused the latch hooks to be disengaged from the container handles and the V notches opened, as shown in full lines in FIG. 3, the container is automatically released and can be wheeled away without the necessity for manually opening or disengaging the latches. The next container to be emptied can then be quickly wheeled into position and the operation repeated.

As will be readily appreciated, with the present invention both the attachment and detachment of the mobile container is simplified and speeded and the efficiency of the loading operation is increased, as compared to prior self-loading devices. Moreover, when the refuse truck is being transported between pick-up locations or to the disposal area, or when it is desired to load the truck by hand, it is possible to fold the lifting arms from the full line position of FIG. 3 to the position of FIG. 5, against and parallel with the side walls of the hopper, as hereinabove described, where said arms will be in an unobstructing, out-of-the-way position. During such folding the springs 25 will snap from the dotted line position of FIG. 6, past center, to the full line position of FIG. 6 to yieldingly maintain the arms in folded position. The result is a novel loading mechanism, which is not only more efficient in operation, but which has other decided advantages over conventional loading devices.

It is to be understood, of course, that the present invention is not to be confined to use in refuse collecting trucks, inasmuch as the novel features of the assemblage might also be used advantageously in other mechanisms. Further, it is contemplated that the lifting apparatus could be used with containers of other types and styles, and the

invention is not to be limited in this respect. Other modifications in the construction and use of the invention will undoubtedly occur to persons skilled in the art, and all of such modifications or changes are contemplated which do not depart from the spirit of the invention, and as may come within the scope of the following claims.

What we claim is:

1. For use with a mobile container having end walls with handles projecting therefrom, loading mechanism for a refuse truck having rear lower corner portions and having a rear loading opening comprising: levers pivotally mounted on opposite sides at the lower rear end of the refuse truck and projecting downwardly and rearwardly when in lowered position, fluid pressure actuated means on the truck operatively connected to said levers and adapted to pivotally move the same rearwardly and upwardly from said lowered to a raised position, said levers having lifting arm portions projecting rearwardly and upwardly when the levers are in a lowered position, said lifting arm portions having outer ends with recesses which open upwardly when the levers are in lowered position and the spacing between said arms being such that when the mobile container is positioned between said arms its handles are positioned to be automatically engaged within the recesses of said arms as the arms move upwardly to thereby raise the container, said lifting arm portions having hinged connecting means which are so disposed as to provide for swinging of the arms, laterally from their rearwardly and upwardly projecting lowered position and then outwardly and then inwardly to a forwardly projecting position adjacent the lower outer sides of the rear of the truck when the arms are not in use.

2. Loading mechanism for dumping a mobile container into a refuse truck having a rear loading opening comprising relatively short levers pivoted to opposite lower rear sides of the truck and having outer ends normally projecting rearwardly and downwardly, fluid pressure actuated operating means connected to said levers to swing the same rearwardly and upwardly from normal lowered position, a rod rigidly connecting said levers and extending across the lower rear of the truck close to the truck when the levers are in a lowered position, and arms connected to said rod and normally projecting rearwardly and upwardly therefrom for movement therewith at a fixed angle with respect to said short levers, and having means for pivotally engaging said container to act with said rod in lifting and dumping the container into the rear loading opening of the truck when the levers are raised, said arms being of such length with respect to the thickness of the mobile container that the latter is spaced outwardly from the rod at initial engagement of the arms with the container, the pivotal engagement of the arms with the container providing for swinging of the container into contact with the rod after the arms have been elevated a predetermined distance.

3. Loading mechanism for dumping a mobile container into a refuse truck having rear lower corner portions and having a rear loading opening comprising fluid pressure actuated means on the truck for engaging said container to lift and dump the same into said rear loading opening of the truck, said means including pivoted lifting arm portions having pivots which are normally close to said rear lower corner portions of the truck and disposed in such a plane that the arms may be swung approximately 180° about generally upright axes around said rear lower corner portions from a rearwardly and upwardly projecting container lifting position to a forwardly projecting inoperative position at the lower sides of the rear end of the truck.

4. Loading mechanism for dumping a mobile container into a refuse truck having rear lower corner portions and having a rear loading opening comprising relatively short levers pivoted to opposite lower rear sides of the truck and having outer ends normally projecting rearwardly and downwardly, fluid pressure operated means connected to said levers to swing the same rearwardly and upwardly from a normal lowered position, means connected to said levers for engaging said container to lift and dump the same into the rear loading opening of the truck, said means including pivoted lifting arms having pivots which are normally close to said rear lower corner portions of the truck and which are disposed in such a plane that the arms may be swung around said rear lower corner portions of the truck from a rearwardly and upwardly projecting container-lifting position to a forwardly projecting inoperative position at the lower sides of the rear end of the truck.

5. For use with a mobile container having end walls with handles projecting therefrom, loading mechanism for a refuse truck having rear lower corner portions and having a rear loading opening comprising: levers pivotally mounted on opposite sides at the lower rear end of the refuse truck and having outer ends normally projecting rearwardly and downwardly, fluid pressure actuated means on the truck operatively connected to said levers and adapted to pivotally move the same rearwardly and upwardly from a lowered to a raised position, a cross rod connecting said levers and extending across the lower rear portion of said truck when in lowered position, blocks rigidly connected to said rod, angular pivot brackets pivotally connected to said blocks, lifting arms connected to said pivot brackets and projecting rearwardly and upwardly when the levers are in lowered position, said lifting arms having outer ends with recesses which open upwardly when the levers are in lowered position and the spacing between said arms being such that when the mobile container is positioned between said arms its handles are positioned to be automatically engaged within the recesses of said arms as the arms move upwardly to thereby raise the container, the pivotal connections between said angular pivot brackets and the blocks being so disposed that the arms may be swung around said lower corner portions of the truck from a rearwardly and upwardly projecting container lifting position to a forwardly projecting inoperative position at the lower sides of the rear end of the truck.

6. For use with a mobile container having end walls with handles projecting therefrom, loading mechanism for a refuse truck having rear lower corner portions and having a rear loading opening comprising levers pivotally mounted on opposite sides at the lower rear end of the refuse truck and having outer ends normally projecting rearwardly and downwardly, fluid pressure actuated means on the truck operatively connected to said levers and adapted to pivotally move the same rearwardly and upwardly from a lowered to a raised position, a cross rod connecting said levers and extending across the back of said truck, lifting arms having bent ends pivotally connected to said cross rod adjacent said levers, said arms when in use projecting rearwardly and upwardly when the levers are in a lowered position, the pivotal connections between the bent inner ends of said lifting arms and said cross rod being so disposed as to provide for swinging of the arms from their rearwardly and upwardly projecting lowered position in a laterally outward direction around the lower corner portions of the rear of the truck and then inwardly to a forwardly projecting position adjacent the lower outer sides of the truck when the arms are not in use.

7. Loading mechanism for dumping a mobile container into a refuse truck having rear lower corner portions and having a rear loading opening comprising fluid pressure actuated means on the truck for engaging said container to lift and dump the same into said rear loading opening of the truck, said means including pivoted lifting arm portions having angular pivot parts which are normally close to said rear lower corner portions of the truck and disposed in such a plane that the arms may be swung ap-

proximately 180° about generally upright axes around said rear lower corner portions from a rearwardly and upwardly projecting container lifting position to a forwardly projecting inoperative position at the lower sides of the rear end of the truck.

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