

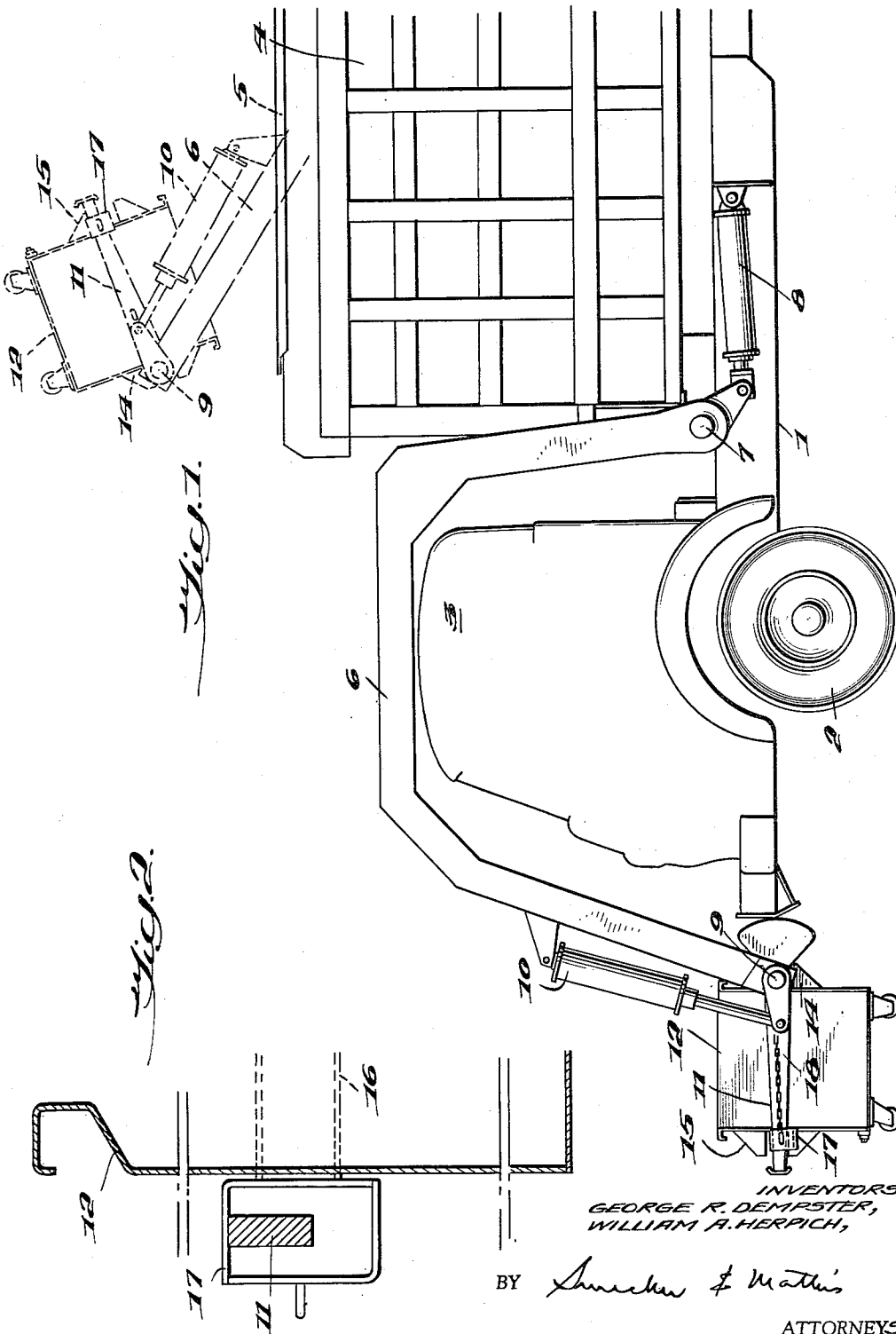
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G. R. DEMPSTER ETAL
CONTAINER LIFTING EQUIPMENT

3,122,249

Filed Aug. 24, 1959

3 Sheets-Sheet 1



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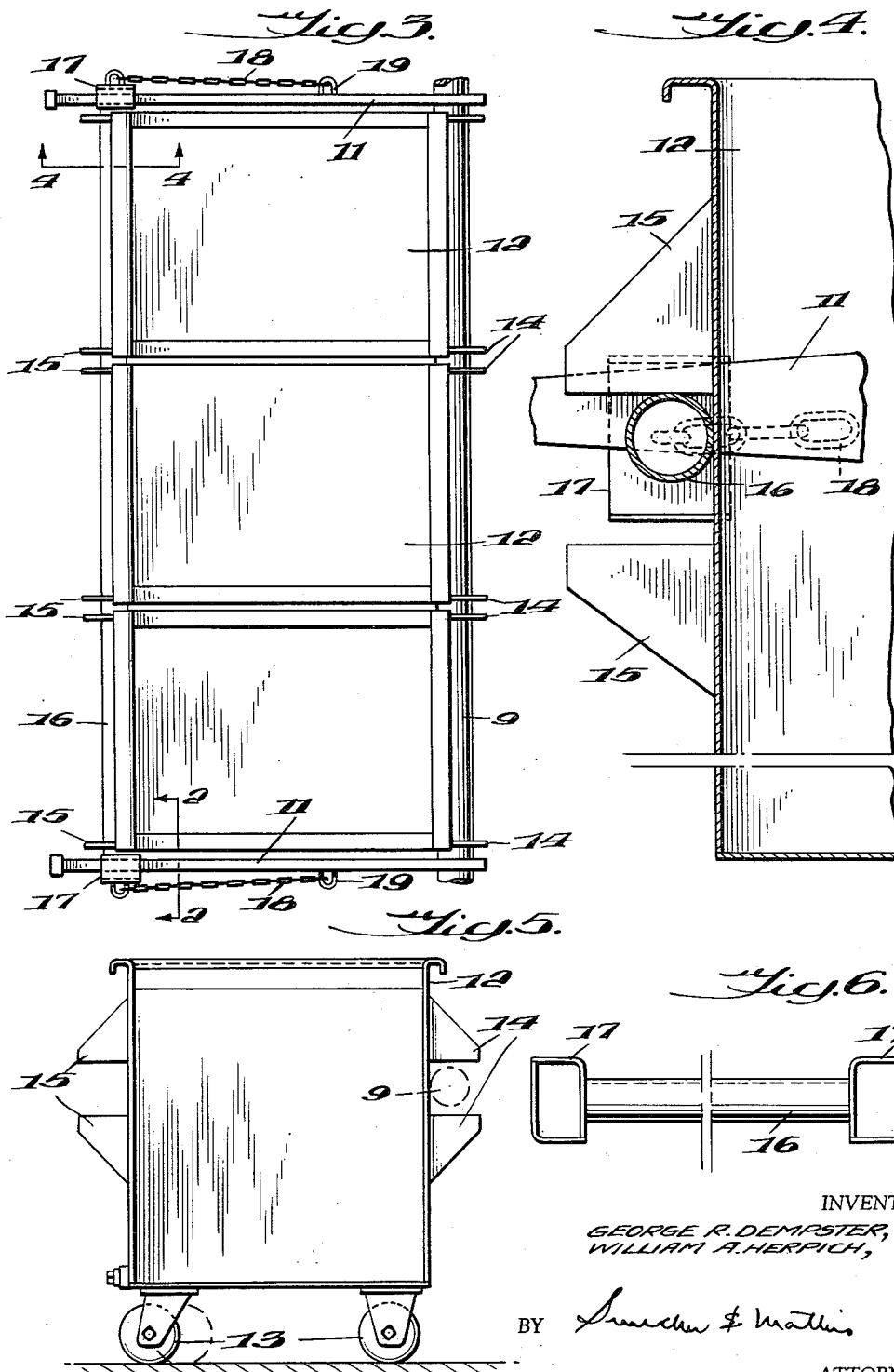
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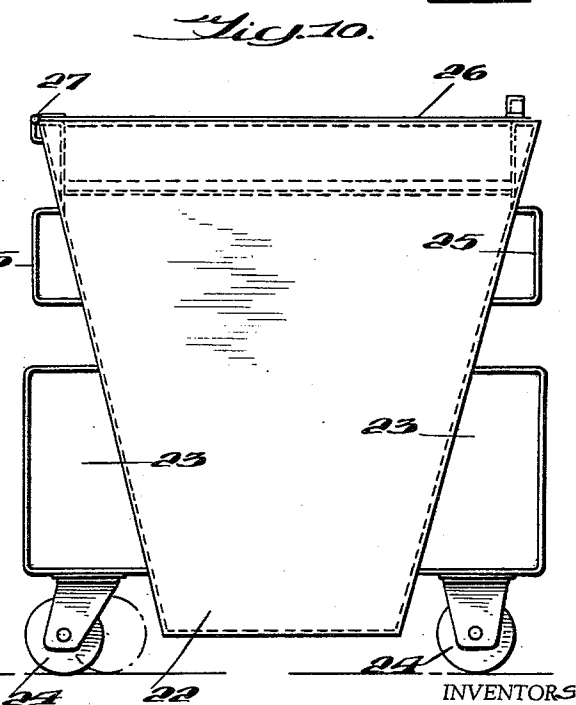
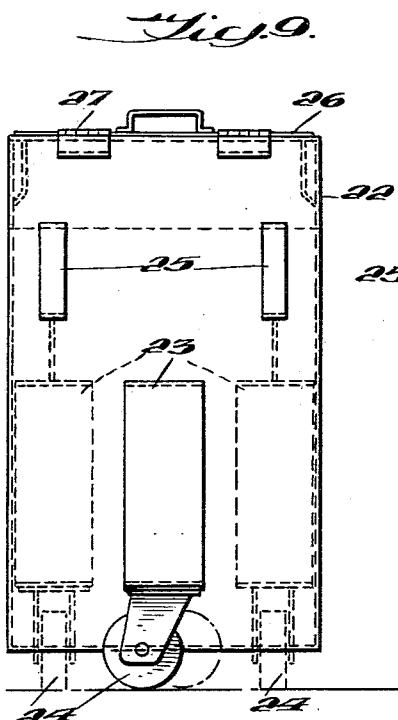
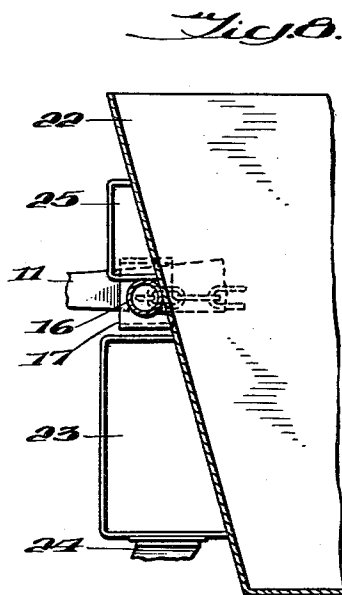
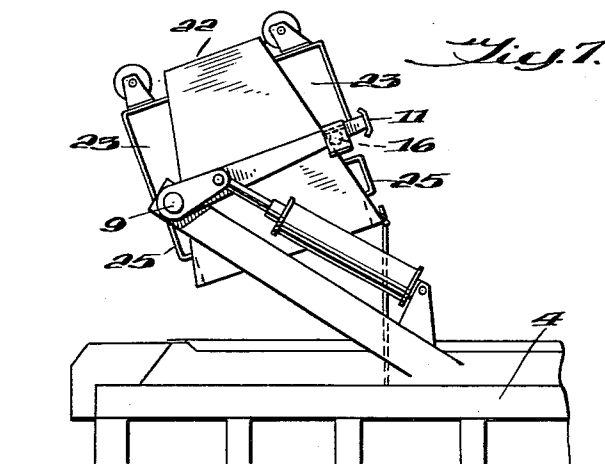
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CONTAINER LIFTING EQUIPMENT

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5 Claims. (Cl. 214—302)

This invention relates to improvements in container handling equipment for transporting and dumping materials such as refuse.

In the use of material transporting and dumping equipment of the character set forth, for example, in our prior patent application, Serial No. 662,252, filed May 28, 1957, now Patent No. 2,900,096, it has been the customary practice heretofore to use a single container, which is lifted individually from the ground or other supporting surface to a dumping position for discharging the contents into the body of the vehicle.

Occasions arise when it is desirable to use smaller containers than those ordinarily provided and which extend throughout the width between the fork arms of the loading mechanism. Usually, the minimum length container that could be accommodated on such equipment has been approximately eighty inches in overall length, due to the spacing of the fork arms from each other and to the necessity for engagement by the fork arms with the opposite end portions of the containers.

It is also desirable to collect the refuse at one or more points which are remote from, and even inaccessible to, the transporting vehicle as, for example, within a building or other structure which is connected to the exterior thereof through narrow passageways. With the size of container customarily used heretofore with such dumping equipment, in the event of the inaccessibility just mentioned, the material would need to be carried to the container-loading point externally of the building by separate transport means and there dumped into the large container.

One object of this invention is to overcome the objections mentioned and to provide a container of smaller capacity than was possible heretofore and at the same time would meet the need for reduced overall dimensions.

Another object of the invention is to provide a multiple container assembly wherein a plurality of containers can be picked up and dumped at one time for discharging the contents therefrom into a refuse body without the necessity for individual dumping thereof.

Still another object of the invention is to improve the construction of the containers and the equipment for handling the same to facilitate the attachment thereof to the dumping unit and to hold one or more containers effectively in place during the dumping action.

These objects may be accomplished, according to one embodiment of the invention by providing a container assembly that may include one or more containers according to the overall size of each that may be desirable and which can be moved individually into position for coaction with the dumping equipment. Where several containers are to be dumped at one time, these may be moved one by one into position, where they will stand in side-by-side relation. All of them can be engaged uniformly by the lifting mechanism of the loading equipment and dumped simultaneously.

Each of the containers is provided with wing plates on the front and back thereof for engagement with the torque tube or rod of the dumping equipment and for engagement by the locking member at respectively opposite sides of each container. Thus, the containers are held in an assembly by the locking member in embracing relation when the locking member is engaged by the fork arms of the dumping mechanism. They may be connected with

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the dumping mechanism easily and quickly, so as to be dumped simultaneously when desired.

Certain embodiments of the invention are illustrated in the accompanying drawings, in which:

FIG. 1 is a side elevation of the vehicle, having the dumping mechanism applied thereto and showing this invention in connection therewith;

FIG. 2 is a cross section through a portion of one of the containers and including the dumping mechanism, taken on the line 2—2 in FIG. 3;

FIG. 3 is a top plan view of the container assembly, showing a part of the dumping mechanism;

FIG. 4 is a detail cross section therethrough, on the line 4—4 in FIG. 3;

FIG. 5 is an end elevation of one of the containers detached;

FIG. 6 is a side elevation of the locking member or tube;

FIG. 7 is a detail side elevation of a portion of the dumping mechanism and vehicle, with a modified form of container in dumping position;

FIG. 8 is a detail section through the modified form of container;

FIG. 9 is a side elevation thereof; and

FIG. 10 is an end elevation thereof.

The invention is shown applied to front end loader mechanism of the character set forth in our prior application, Serial No. 662,252, filed May 28, 1957, now Patent No. 2,900,096. It may be used, however, in connection with any suitable or desired form of dumping mechanism.

In the form of the invention shown in FIG. 1, the conventional motor vehicle chassis is illustrated generally by the numeral 1, which includes the usual ground engaging wheels 2, and the vehicle is adapted to be self-propelled, with the operator's cab being indicated at 3 within which suitable mechanism is located for controlling the vehicle. Mounted on the vehicle chassis 1 is a suitable refuse body 4, according to the illustration in FIG. 1, into which the refuse may be dumped, as herein described. A filling opening or hopper is shown at 5 in the top of the body 4 through which the refuse can be discharged into the latter.

The loading mechanism comprises a pair of lifting arms, generally indicated at 6, which are shown as of gooseneck shape so as to extend over the vehicle cab 3 and downward in front and back thereof, as illustrated in FIG. 1. The arms 6 are supported on the vehicle chassis 1 by a torque tube 7 rearwardly of the cab 3. These arms 6 are operatively connected with the hydraulic power devices 8, such as power cylinders, which are actuated to swing the arms 6 between the lowered position shown in full lines in FIG. 1, and the upper or dumping position shown in dotted lines therein.

At their opposite ends from the torque tube 7, the lifting arms 6 extend downward to positions substantially at the level of the chassis frame in front of the vehicle, and are connected together by a torque tube or rod 9 extending between the laterally spaced arms 6, as illustrated in FIGS. 1 and 3. The torque tube 9 is adapted to be rotated by suitable power means, such as hydraulic cylinders 10, mounted on the lifting arms 6. The torque tube or rod 9 supports a pair of fork arms 11 on opposite end portions thereof, which are operatively moved by the power devices 10 to positions above or below the axis of the torque tube or rod 9, as indicated in full lines and in dotted lines in FIG. 1.

The foregoing construction is described more in detail and claimed in our prior application, Serial No. 662,252, now Patent No. 2,900,096, as referred to above.

We have shown containers that are generally designated at 12, which are illustrated as open top and fairly rectangular containers. Hinged or other types of lids may

be provided thereon, if desired, in any conventional manner. These containers may be provided with flat bottoms that rest directly on the ground or other supporting surface or upon rollers, either fixed or swivelled, as indicated generally at 13, in FIG. 5. When the rollers are provided, the containers can be rolled through narrow passageways and into and out of buildings, and can be rolled into positions where they stand side-by-side between the pair of spaced fork arms 11, as illustrated in FIG. 3.

Any suitable or desired size or form of container may be used, according to the requirements, and while it is preferred that these be of such size that several of them can be picked up and dumped at one time, any suitable number thereof may be thus accommodated, or a single container may be picked up and dumped, whether or not it extends throughout the space between the fork arms 11.

Each of the containers 12 is provided with pairs of wing plates 14 and 15, respectively, that are located on the front and rear walls of the containers and adjacent opposite ends thereof. The wing plates of each pair are spaced apart vertically, as illustrated in FIG. 5, so as to form a slot or notch therebetween, to facilitate the picking up and dumping of the container. Thus, two pairs of wing plates 14 are provided on the rear side of each container and two pairs of wing plates 15 are provided on the front side of each container. However, these are preferably duplicates, so that the container, when it has an open top without lids, may be reversed side-for-side and need not be moved into a dumping position in any particular relation to the lifting mechanism. If hinged lids are used (FIG. 7) the hinge preferably should be away from the vehicle.

The wing plates 14 are spaced apart, so as to accommodate the torque tube or rod 9 therebetween when the containers 12 are seated on the ground or other supporting surface and when the lifting arms 6 are in their lowered positions, which latter can be varied, however, to accommodate the height of the container. It is preferred that the containers 12 be moved between the fork arms 11 until their rear walls abut against the torque tube or rod 9, as illustrated in dotted lines in FIG. 5.

At the opposite side of the containers 12, the wing plates 15 are spaced apart a distance sufficient to accommodate a container locking member or tube 16, which extends lengthwise of the assembled containers, as shown in FIG. 3, substantially from one of the fork arms 11 to the other, so as to embrace, with the fork arms 11, the assembly of containers and to hold these securely in place. The disposition of the locking member or tube 16 within the notch between the vertically spaced wing plates 15 causes the respective containers to be supported on this locking member or tube 16, both when the containers are in their upright positions, as shown in FIGS. 1 and 4, and when the containers are inverted in dumping positions, as shown in dotted lines in FIG. 1.

At each opposite end, the locking member or tube 16 is provided with a bracket or sleeve portion, indicated at 17, in position for engagement by the adjacent fork arm 11. The bracket or sleeve portion 17 is shown, and preferably formed, as a channel or pocket, for lengthwise passage of the adjacent fork arm 11 therethrough, thereby to support the locking member or tube 16 on the fork arms 11 and to enable the locking member to slide lengthwise of the fork arms into abutting relation with the adjacent side walls of the container assembly 12 between the vertically spaced wing plates 15.

When the fork arms 11 are tilted about the axis of the torque tube or rod 9, the container assembly will be held in supported position between the torque tube or rod 9 and the retaining or locking member 16 but, if desired, a retainer chain 18 may extend from each of the brackets 17 to a fastening ring 19 on the outer face of the adjacent fork arm 11, preferably having a snap engagement therewith for ready detachment or attachment of the chain. This retaining means will aid in preventing acci-

dental separation of the locking member 16 during lifting and dumping of the containers or when the latter are inverted in their dumping positions, as shown in dotted lines in FIG. 1.

In the use of this equipment, it will be apparent that the front end loading mechanism can be moved from place to place to pick up containers or refuse and to dump the contents into the body through the opening 5 in the top thereof.

When the loading mechanism is moved up to a point of dumping, the lifting arms 6 and fork arms 11 are lowered substantially to the positions shown in FIG. 1, although the height of these will vary according to the size of containers that are to be accommodated. When a plurality of small-sized containers are to be dumped, these can be moved into side-by-side relation between the fork arms 11, as will be apparent from FIG. 3. Thereafter, the retainer member 16 is set into place between the vertically spaced wing plates 15 and in engagement with the adjacent front walls of the containers 12. The brackets 17 on the opposite ends of the retainer member 16 should be fitted over the fork arms 11, so that, upon lifting movement of the lifting arms 6 and the fork arms 11, the retainer member 16 will be lifted also. This, in turn, will impart an upward lifting motion to the containers, both directly against the forward faces of the walls thereof and to the uppermost wing plates 15. Outward sliding movement of the retainer member 16 during this lifting action can be prevented by suitable retaining means, such as chains, illustrated at 18.

The lifting action of the containers 12 is continued until the latter are moved to positions over the front portion of the body 4, when, upon operation of the power devices 10, the fork arms 11 are rotated to invert the containers 12 and thus dump the contents through the opening 5 into the body 4.

Thereafter, the motion can be reversed to set the containers 12 back on the ground or other supporting surface, where they may be moved away, individually, to points of refilling. The retaining member 16 can be detached readily when the containers are set down, thus freeing and disconnecting the individual containers from the hoisting mechanism, so as to permit these to be handled separately and individually.

A modified form of container is illustrated in FIGS. 7 to 10, designated generally by the numeral 22. The body of the container has opposite sides thereof tapering in an upward direction, although the ends thereof may be vertical. The size of the container may be varied, as desired, although several such containers can be nested side-by-side in the relation illustrated in FIG. 3.

The body of the container is provided with outrigger pockets 23 on the tapering upwardly extending walls, having casters 24 connected therewith, either fixed or swivelled, or some may be fixed and others swivelled for ease of handling of the container. The body of the container 22 is also provided with handles 25 projecting outwardly from the sloping walls thereof for grasping by the operator to control the movement of the container from place to place. Two such handles are shown on each of the sloping walls, although any suitable number and type thereof may be provided, as desired.

The outrigger pockets 23 and handles 25 are spaced apart vertically, so as to provide recesses therebetween comparable to the recesses provided between the wing plates 14 and 15 (see FIGS. 4 and 5), for receiving in these spaces the torque tube 9 and container locking tube 16 in the manner illustrated in FIGS. 7 and 8. By having the opposite walls of the container body sloping in the manner illustrated, it is unnecessary for these parts 23 and 25 to project outwardly beyond the upper edges of the walls, thereby protecting the person or property from damage by reason of engagement therewith.

The container body 22 is shown as provided with a covering lid 26, hinged to the body at 27. When the

container is moved to its dumping position, as illustrated in FIG. 10, the lid 26 will open automatically in the filling opening of the body 4.

The dumping action of this form of container will be the same as has been described above in connection with the form shown in FIGS. 1 to 6 and will be apparent from the illustration in FIG. 7.

In this way, a plurality of containers can be accommodated. Each of the containers does not need to be of a size that will extend throughout the spacing of the fork arms 11, although a single container may be so proportioned, but any suitable or desired number of containers can be accommodated therebetween, according to the shape and capacity thereof. It is thus possible to use containers with this equipment that are relatively small and of small capacity, and to provide for the dumping thereof into the refuse body by the lifting mechanism. Moreover, such plurality of containers can be dumped simultaneously without requiring individual dumping action and they can be accommodated and handled as an assembly and effectively cause discharge of the contents therefrom.

While the invention has been illustrated and described in certain embodiments, it is recognized that other variations and changes may be made therein without departing from the invention as set forth in the claims.

We claim:

1. In a front end loader of the character described, the combination with a motor vehicle having a body thereon, of a lifting arm structure operatively mounted on the motor vehicle for raising and lowering movements with respect thereto, a cross member carried by the lifting arm structure at the front of the motor vehicle in the lowered position of the lifting arm structure, one or more containers disposed substantially in abutting relation with the cross member, fork arms operatively connected with the lifting arm structure and extending outwardly from the cross member in embracing relation with the containers, a locking member extending transversely of the containers on the opposite side thereof from the cross member, said locking member having bracket structures on opposite ends thereof slidably receiving the fork arms therethrough for holding the containers in place during raising movement to dumping positions with respect to the body.

2. In a front end loader of the character described, the combination with a motor vehicle having a body thereon, of a lifting arm structure operatively mounted on the motor vehicle for raising and lowering movements with respect thereto, a cross member carried by the lifting arm structure at the front of the motor vehicle in the lowered position of the lifting arm structure, one or more containers disposed substantially in abutting relation with the cross member, fork arms operatively connected with the lifting arm structure and extending outwardly from the cross member in embracing relation with the containers, a locking member extending transversely of the containers on the opposite side thereof from the cross member, said locking member having bracket structures on opposite ends thereof slidably receiving the fork arms therethrough for holding the containers in place during raising move-

ment to dumping positions with respect to the body, and wing plates connected with each container and disposed in embracing relation with the cross member and locking member respectively for supporting the container therebetween during said dumping movements.

3. In a front end loader of the character described, the combination with a motor vehicle, of a lifting arm structure operatively mounted on the motor vehicle for swinging movement with respect thereto, said lifting arm structure including a cross member, fork arms pivotally mounted on the lifting arm structure adjacent opposite ends of the cross member in position to receive and support a container therebetween and against the cross member, and a locking member for the container including a second cross member having sleeve portions at opposite ends thereof slidably receiving the fork arms therethrough.

4. In a front end loader of the character described, the combination with a motor vehicle, of a lifting arm structure operatively mounted on the motor vehicle for swinging movement with respect thereto, said lifting arm structure including a cross member, fork arms pivotally mounted on the lifting arm structure adjacent opposite ends of the cross member in position to receive and support a container therebetween and against the cross member, a locking member for the container including a second cross member having sleeve portions at opposite ends thereof slidably receiving the fork arms therethrough, and means extending lengthwise of the fork arms anchored at one end to the fork arms and at the opposite end to the sleeve portions for holding the locking member in place against the container.

5. In a front end loader of the character described, the combination with a motor vehicle, of a lifting arm structure operatively mounted on the motor vehicle for swinging movement with respect thereto, said lifting arm structure including a cross member, fork arms pivotally mounted on the lifting arm structure adjacent opposite ends of the cross member in position to receive and support a container therebetween and against the cross member, and a locking member for the container including a second cross member having sleeve portions at opposite ends thereof slidably receiving the fork arms therethrough, the locking member having the sleeve portions in axial alignment with the second cross member and symmetrical with respect to the width of the latter.

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