June 27, 1972 F. E. NEUZIL, SR. 3,672,724

CONTAINER IMPLEMENT FOR END LOADER VEHICLE

Filed March 1, 1971 2 Sheets-Sheet 1

Fig. 1

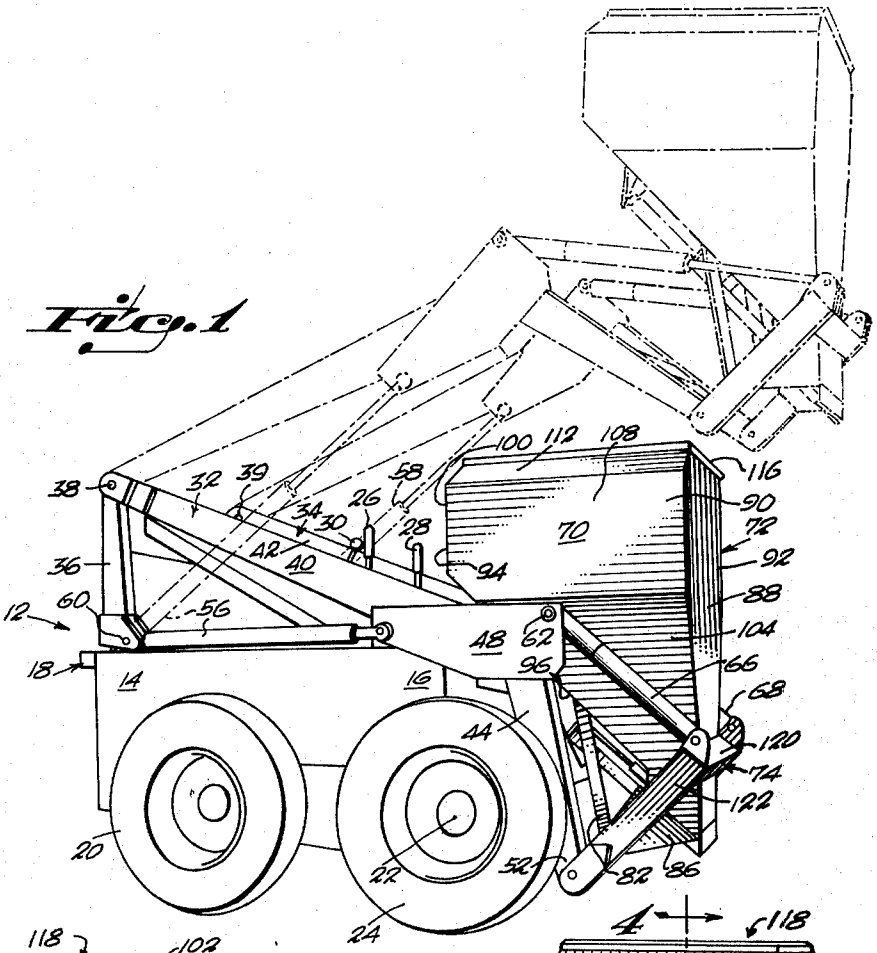


Fig. 2

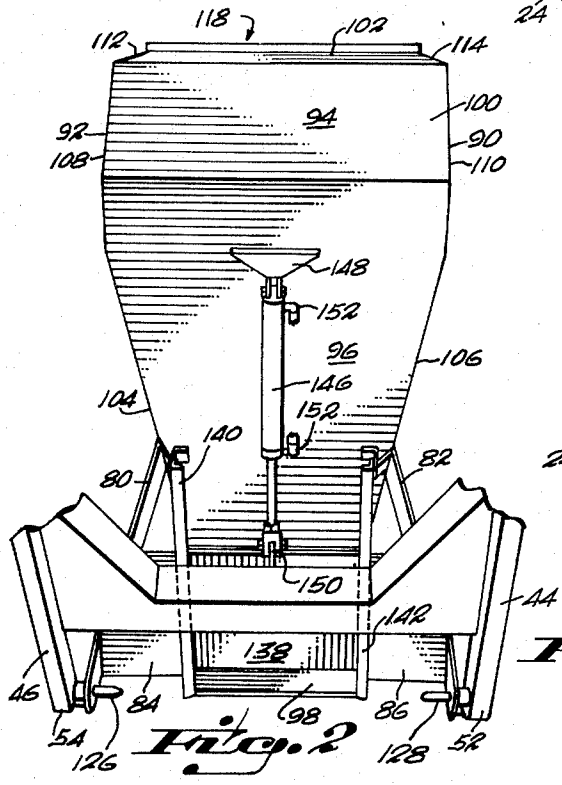
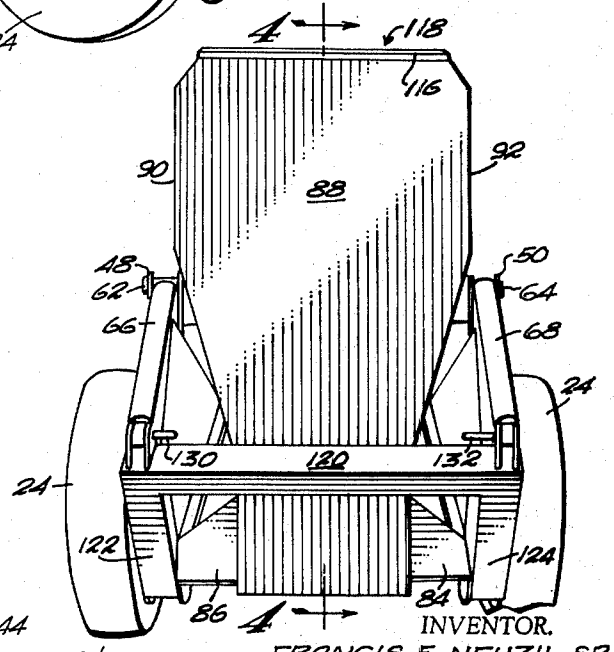


Fig. 3



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CONTAINER IMPLEMENT FOR END LOADER VEHICLE

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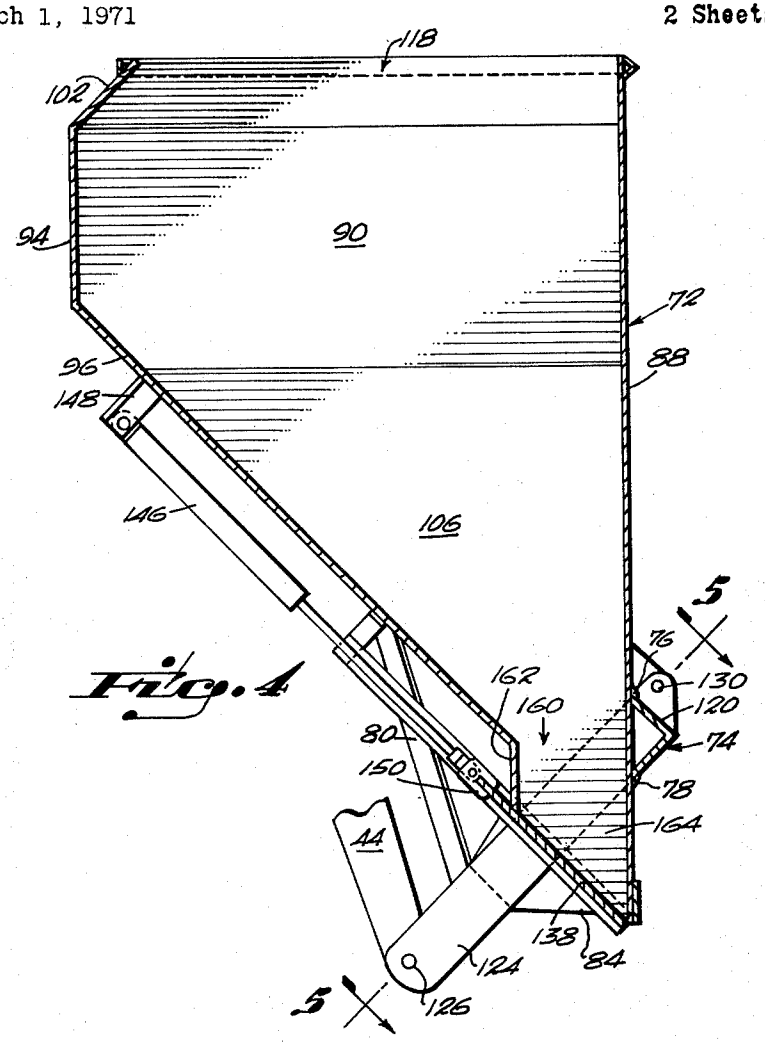


Fig. 4

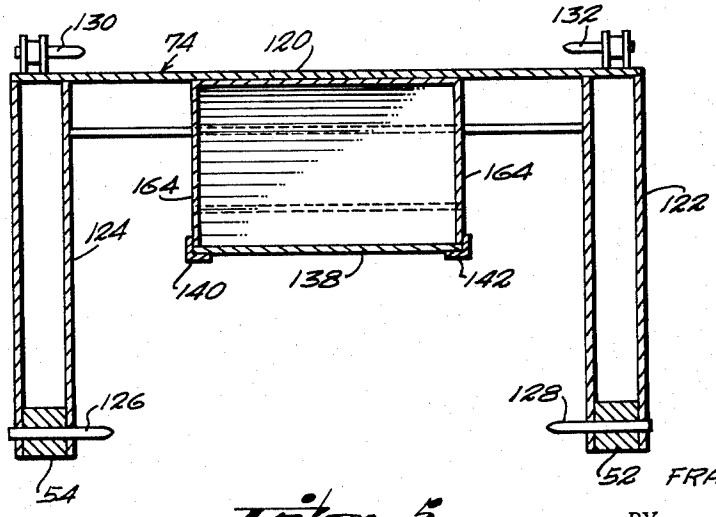


Fig. 5

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CONTAINER IMPLEMENT FOR END LOADER VEHICLE

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ABSTRACT OF THE DISCLOSURE

A container implement for attachment to a front end loader which includes a mounting yoke with a pair of rigid arms to pivotally connect to a front end loader and a bucket rigidly connected to the mounting yoke for hauling materials and discharge of the same through a shoot opening at the lower end. The discharge opening is adapted to be opened and closed by a hydraulically operated slide panel type door. The rear wall of the bucket converges toward the front wall at about the discharge opening so that the weight of materials carried in the bucket has a center of gravity closely adjacent the vehicle to resist the moment tending to lift the opposite end of the vehicle to which the implement is attached.

This invention relates to an improved container implement composed of a rigidly interconnected mounting yoke and bucket for attachment to an end loader, such as a front end loader vehicle. It is structured to carry materials such that the center of gravity of the materials is arranged in close adjacent relation to the front end of the vehicle, to resist a turning or tilting moment tending to lift the rear or opposite end of the vehicle.

At many job sites, it is often necessary to carry materials such as trash, sand, cement or the like from one location to a relatively close location for discharge. Quite often expensive labor is required to carry small loads repeatedly or intermittently. This invention provides an inexpensive container implement attachment for front end loaders which is adapted to carry such material from one location to another and to carry a substantial load.

It is an object of this invention to provide an improved container implement for attachment to lift arms of an end loader vehicle which includes a bucket with side walls shaped to define a chamber to carry materials so that the center of gravity of the materials in the chamber is in close adjacent relation to the end of the vehicle frame to reduce forces tending to lift the other end of the vehicle, and which includes a discharge opening with a door adapted to be opened and closed by hydraulic means, the container being adapted to be swingably moved by swing arms when attached on the vehicle from a lower position for loading to an elevated position for unloading.

It is a general object of this invention to provide an improved container implement which includes a bucket for transporting materials, said bucket including an upper rim portion circumposed about the charge opening for the materials which rim converges inwardly to resist slopping of materials over the sides of the container in transit and a piston means to operate the door closing the discharge opening to move it from an open to a closed position.

While other objects will become apparent hereinafter in view of the accompanying drawings and the following description, and the objects aforestated are not intended to be limiting for this reason, it is a general object of this invention to provide an improved container implement for end loaders, which is characterized by a rigidly connected mounting yoke and a bucket, the mounting

yoke containing means for pivotal connection of the implement to lift arms of the loader and for pivotal adjustment of the container into a range of positions of orientation when the lift arms are operated to raise and lower the container, the improved container implement being simple in construction, inexpensive to manufacture, and well adapted for the purposes expressed herein.

In accordance with these and other objects which will become apparent hereinafter, this invention will be described with reference to the accompanying drawings in which:

FIG. 1 is a perspective view of the end loader vehicle with the improved container implement mounted thereto and illustrating in chain-dot lines the operation of the device;

FIG. 2 is a partial rear view of the device shown in FIG. 1 illustrating the rear of the container implement;

FIG. 3 is a partial view illustrating the front of the container implement;

FIG. 4 is a view in cross section taken on the plane indicated by the line 4—4 of FIG. 3; and

FIG. 5 is a view in cross section taken on the plane indicated by the line 5—5 in FIG. 4.

Referring to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in FIG. 1, an end loader which is generally designated by the numeral 12. It is characterized by a center of gravity such that the rear end zone portion 14 is heavy relative to the front end zone 16; it may be provided with an attachment and counterweight generally designated by the numeral 18 to increase the load at the rear portion. Generally, it is seen that when in a normal unloaded condition, the heavier rear portion 14 will cause the rear wheels 20 to remain on the ground, but that when an implement is attached and placed under a load at the front end, this will cause a moment tending to lift the heavy rear end about the axis 22 of the front wheels 24 and against the heavily loaded rear. The present invention, as will be described comprises a container implement preferably for front end attachment. The implement provides structure to minimize this rear end lifting moment.

Referring further to the loader, as is conventional, it includes a seat for the driver and controls generally designated by the numerals 26, 28 and 30 for driving the vehicle and for operating lift arms and other hydraulic attachments of the vehicle, chiefly for the purpose of manipulating and orienting an implement through hydraulic leads. In the vehicle designated by the numeral 12, it is seen that it is provided with lift arm means comprising a pair of arms 32 and 34 pivotally connected to a rigid extension of the frame of the vehicle such as that designated by the numeral 36, the pivotal connections being indicated by the numerals 38 and 39.

Each of the lift arms includes an upper arm portion 40 and 42 generally extending longitudinally of the vehicle and lower arm portions 44 and 46 which generally extend from a rigid elbow 48 and 50 downwardly to a terminal end portion 52 and 54. The arms of the pair are adapted to be moved pivotally and synchronously about their respective pivots 38 and 39 between an elevated position shown in chain-dot lines in FIG. 1, which is usually for unloading purposes with this invention, and a lowered position shown in FIG. 1, which is usually for loading. It will be seen that a line or axis through the terminal end portions 52 and 54 of the arms is closely adjacent the end of the vehicle frame. This line is also closely adjacent the front axle 22 of the vehicle to reduce, as much as practical, the moment tending to lift the rear of the vehicle when a loaded implement is attached to the terminal end portions

of the arms; i.e., caused in a clockwise lift of the rear end, as seen in FIG. 1.

Means are provided to swing the lift arms about the axis through the pivots **38** and **39**. The means are composed of piston type synchronously operable rams **56** and **58**, which are pivotally connected at their respective proximal ends to the vehicle, as at **60**, which is in spaced relation from the pivots **38** and **39**. The extending or distal ends of the rams are pivotally connected respectively to their associated lift arms **32** or **34**. The pivotal connection of the rams to the lift arms is in spaced relation from the pivots **38** and **39** and preferably at about the elbow region, which, as shown, may comprise a plate attached at the juncture of the upper and lower portions of the lift arms.

The distal or tonal end portions of each of the lift arms is adapted for pivotal connection to an implement, through terminal end means including through holes which are aligned with one another and define an axis of an implement attached to the arms. Preferably at the elbow region and spaced from the axis defined by the aforesaid holes, pivot means are provided defining a lateral axis therethrough, the pivot means being designated by the numerals **62** and **64**. From each pivot a piston **66** or **68** extends for pivotal connection to an implement connected to the terminal end of the lift arms. These pistons which comprise means to swing an implement are for adjusting the orientation of an implement relative to the lift arms, especially when the arms are swingably raised or lowered. As is conventional, the vehicle or tractor is provided with hydraulic lead lines to supply controlled fluid flow to manipulate implements connected to the vehicle and which are controlled by the control means on the vehicle which, in the preferred embodiment are effective to pivotally swing the lift arms about the pivots **38** and **39**, to selectively operate the means to swing the implement through a range of orientation positions relative to the swing arms and to control flow through the lead lines to manipulate portions of any implement connected to the vehicle.

Referring now to the container implement, which is designated by the numeral **70**, it is seen in FIG. 1 that it includes a container **72** and a mounting yoke **74**. The mounting yoke and the container are rigidly connected to one another as indicated in FIG. 4, for instance at **76** and **78** by welding, and by bracers, seen in FIG. 2 and designated by the numerals **80** and **82** and **84** and **86**. The container includes a front wall **88** opposing side walls **90** and **92** and a rear wall **94**. Preferably, the front wall extends vertically upwardly from a connection with the central portion of the yoke, as shown in FIGS. 1 and 4. The rear wall **94** includes a portion **96** which converges or slants toward the front wall and terminates at a lower discharge opening **98**. The rear wall may include an upper portion **100** which extends vertically above the converging portion **96** and in a preferred embodiment is provided with an inwardly converging rim portion **102**. In similar manner, the side walls may be provided with lower converging portions **104** and **106** and upper portions **108** and **110** with a rim **112** and **114** mating and corresponding with the rim **102** of the rear wall. The rim defines, together with the upper marginal edge **116** of the front wall a charge opening **118** for the receipt of materials to be transferred from one location to another.

The mounting yoke includes a lateral member **120** and a pair of rigid arms **122** and **124** which extend in a common rearward direction. The distal ends of these rigid arms are provided with pivot pin means, seen in FIG. 5 and designated by the numerals **126** and **128** which are adapted to be received in the aligned holes of the terminal end means of the lift arms for pivotal movement of the container implement. The bucket assembly of the container and yoke is pivotally connected to the extending end of the piston rams through pivot pin means, preferably carried by the yoke and designated by the numerals **130** and **132** in FIG. 5. It is thus seen that when the lift arms are swingably moved, the pistons may be adapted to orient the bucket assembly into a generally vertical attitude, that is with the charge opening **118** above the discharge opening **98** by swinging movement of the implement about the axis through the pivots **126** and **128**, and as indicated generally in FIG. 1.

A door **138** is provided to open and close the discharge opening **98**. Guide means, preferably in the form of opposing rails or tracks, **140** and **142**, secured to the converging portion of the rear wall limit the door which is preferably a slide panel type door to movement of translation between a door open and a door closed position and in a plane generally parallel to the adjacent portion of the plane of the rear wall. Means are also provided to open and close this door, the means of the preferred embodiment comprising a hydraulically operated piston **146** which is secured at one end to a mounting plate **148** on the rear portion and at the other end to a connector means **150** on the door. The piston **146** includes an adapter **152** to receive the hydraulic lead lines from the vehicle when it is mounted to it.

In operation, the vehicle is most often loaded when the arms are in a lowered position. It is seen that by reason of the structure described hereinbefore the center of gravity of the load is arranged close to the axis **22** through the front wheels and opposite to the heavier rear end of the vehicle. The vehicle is then driven to the location where it will be unloaded, for instance onto a truck. To do this, the arms are raised while the orientation of the container implement into a generally vertical attitude is maintained. After being elevated, the door is opened whereupon the materials will pass through the opening generally tending to be thrust by reason of the converging rear wall outwardly and through the discharge opening and into the loading bed of the truck. In transit, the rim restricts slopping of the materials over the side of the container. After unloading, the arms are lowered and the vehicle is again loaded at a loading station or location.

In a preferred embodiment, the height of the container overall may be approximately 50 inches, the distance between the side walls may extend to 28 inches, and the distance between the front and rear walls may be about 32 inches. The radius at the corners of the bucket should be preferably about 1 inch so that concrete carried in the container does not readily set within but flows relatively freely. In the preferred embodiment, the side walls are of one piece construction and welded at the interface. The interior walls of the container are smooth and the zones at the margins of the walls are smooth so as not to restrict flow through the interior of the bucket. Also, in the preferred embodiment, the discharge opening includes a throat section **160** which includes a downwardly extending neck portion on the rear wall as at **162** and on the side walls as indicated by the numeral **164** in FIG. 4.

What is claimed is:

1. An improved bucket implement to carry material, said implement being adapted for attachment to an end loader vehicle which is characterized by a predetermined center of gravity with a first relatively heavy end zone on one side of the center of gravity and a second relatively light end zone on the other side of the center of gravity, which includes:

(a) main lift arm means pivotally connected to the vehicle for swinging movement about a first lateral axis, the arm means having terminal end means for pivotal attachment defining a second lateral axis and to connect to an implement for swinging of the implement about the second lateral axis and means to pivotally move the lift arm means through a swing arc about the first lateral axis to raise and lower the terminal end means, the arm means being of a longitudinal dimension sufficient to extend outboard in close adjacent relation to the second end of the vehicle,

(b) pivot means defining a third lateral axis on the lift arm means spaced from the terminal end means, and means to swing an implement connected to the terminal end means about the second lateral axis through a range of orientation positions relative to the arm means when the arm means are swingably raised or lowered, said means to swing comprising an extendible means connected to the pivot means,

(c) a hydraulic lead line means to supply controlled fluid flow to manipulate an implement when connected to the arm means and to the means to swing; and

(d) control means on the vehicle to (1) selectively operate the means to pivotally move the lift arm means, (2) to selectively operate the means to swing the implement, and (3) to control flow to the hydraulic lead line means;

said improved bucket implement for materials, comprising:

a bucket assembly including:

(A) a mounting yoke having a laterally extending member and a pair of rigid arms extending in a common direction from said lateral member,

(B) first pivot pin means characterized by a lateral axis to connect the yoke to the terminal end means of the arm means for swinging movement of said yoke with said lift arm means, and

(C) a bucket secured to said yoke and disposed between said rigid arm, said bucket having front, rear and opposing side walls with a charge opening at one end for loading material therein, and a discharge opening at the other end,

(D) said rear wall having a portion converging toward said front wall and terminating at said discharge opening, said discharge opening being adjacent the front wall;

(E) a door normally in closing relation of said disharge opening;

(F) guide means on the bucket to guide movement of the door between a door open and door closed position;

(G) means to open and close said door and interconnecting said bucket and said door, and including a portion adapted to connect to the hydraulic lead line means; and

(H) second pivot pin means on the yoke spaced from the distal end zones of said yoke to connect to the extendible means,

(I) the interior of said bucket being adapted to receive a charge of materials so that the center of gravity of the charge is carried in close adjacent relation to the second end of the vehicle.

2. The device as set forth in claim **1** wherein the door comprises a slide panel sized to close said discharge opening, said door having opposed marginal edges extending between said front and rear walls when in closing relation of said opening and wherein said guide means comprises opposing tracks carried by the rear wall to constrain the slide panel to movement of translation into and out of closing relation of the discharge opening.

3. The device as set forth in claim **2** wherein the means to open and close said door comprises a hydraulically operable piston.

4. The device as set forth in claim **1** wherein a portion of said side walls converges toward the opposing side wall terminating at said discharge opening.

5. The device as set forth in claim **1** wherein brace means are provided rigidly connecting said rigid arms of said mounting yoke to said bucket.

6. The device as set forth in claim **1** wherein said rear wall includes a portion intermediate the charge opening and the converging portion which extends generally in a common direction relative to said front wall.

7. The device as set forth in claim **1** wherein the bucket is provided with a converging rim portion circumposed about the charge opening to restrict slopping of materials over the sides of the container.

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U.S. Cl. X.R.

214—130, 149, 502; 298—1 C, 11