

[54] **DRUM DUMPING LIFT TRUCK
ATTACHMENT**

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[51] Int. Cl. B65f 3/00
[58] Field of Search 214/302, 313, 315, 314,
214/316, 750, 620, 651, 654

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[57] **ABSTRACT**

A mechanism for attachment to the fork lift of a lift truck. The mechanism fits over and grips a barrel. Then, as the barrel is lifted beyond a predetermined height by the fork lift, the barrel is automatically pivoted over to dump the contents thereof.

8 Claims, 11 Drawing Figures

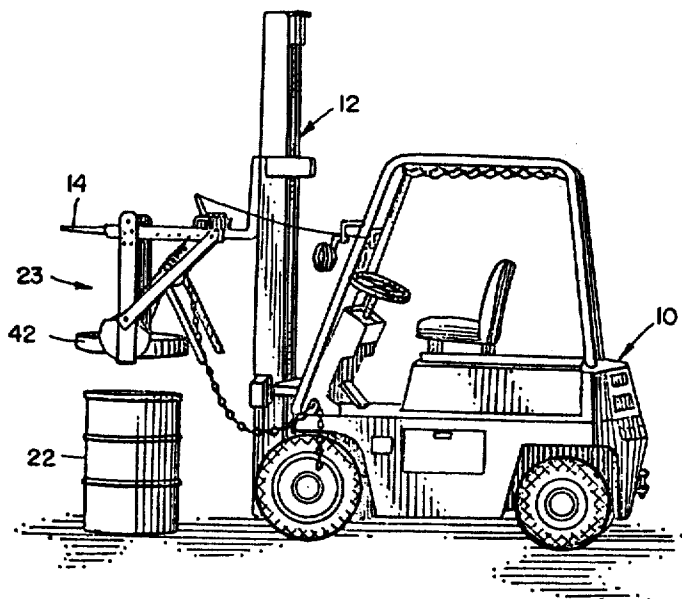


FIG. 1

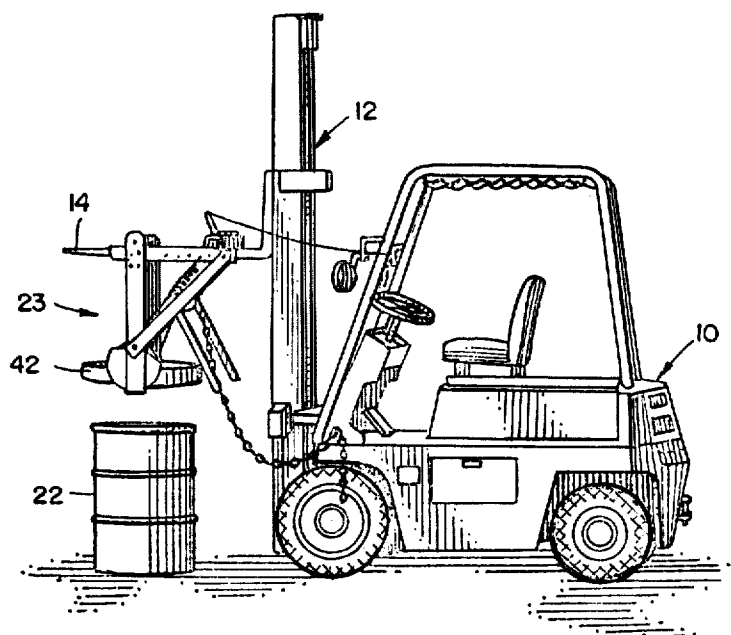


FIG. 2

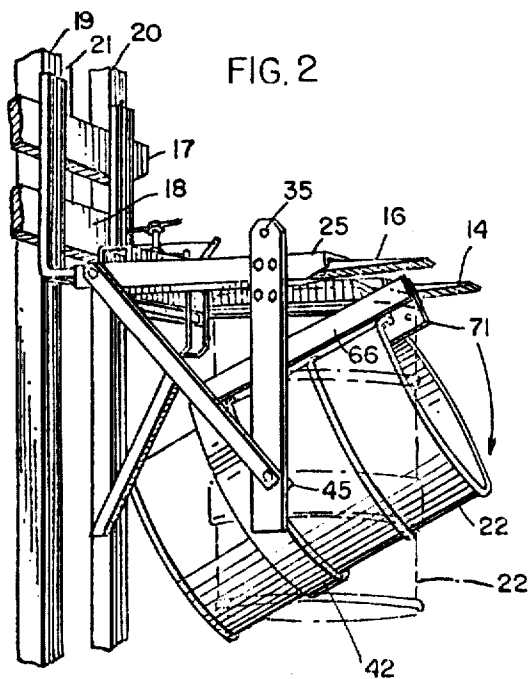


FIG. 3

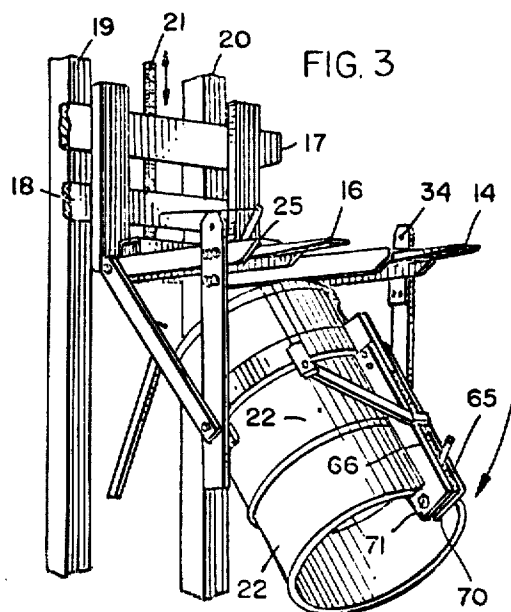


FIG. 4

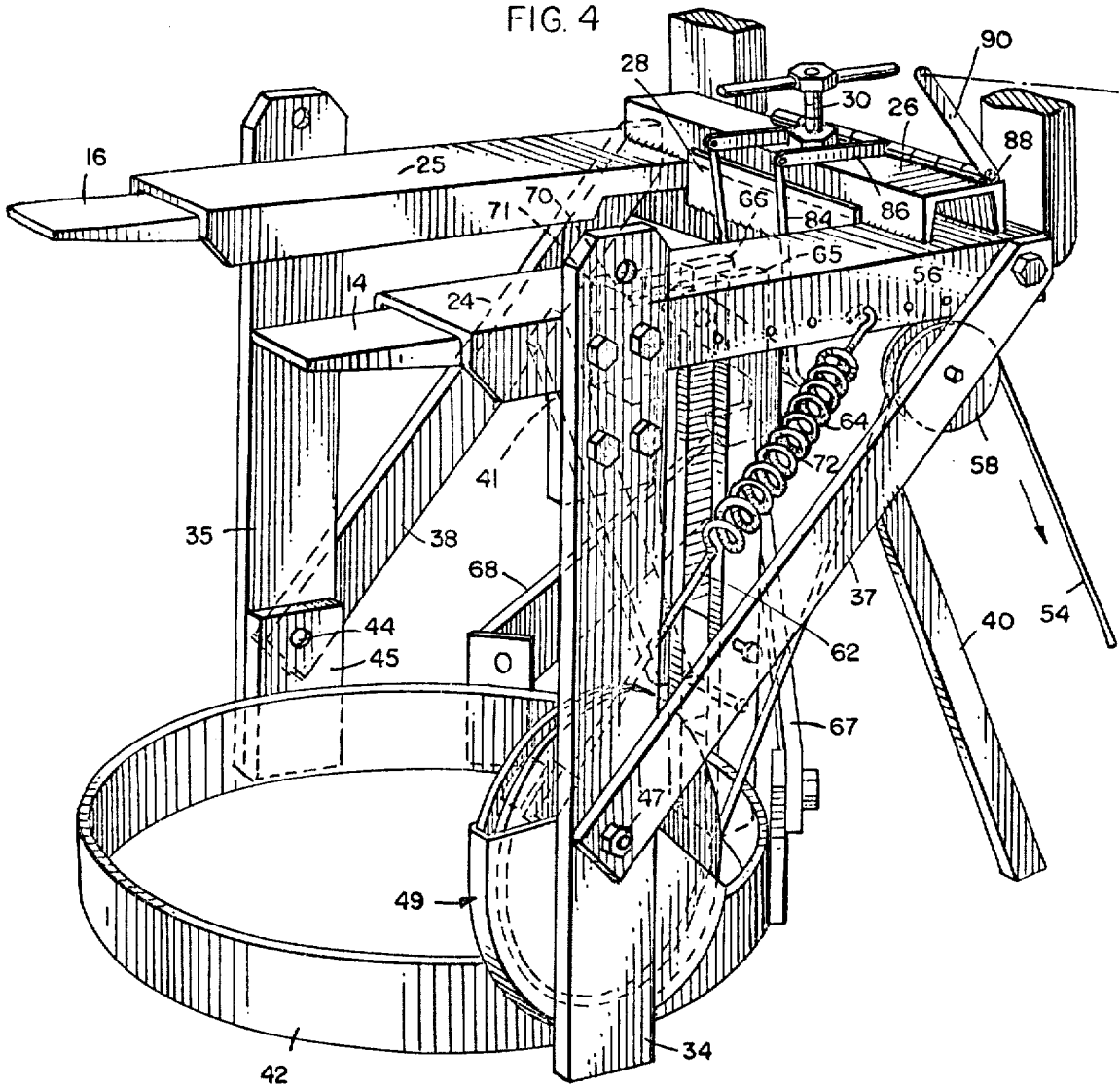
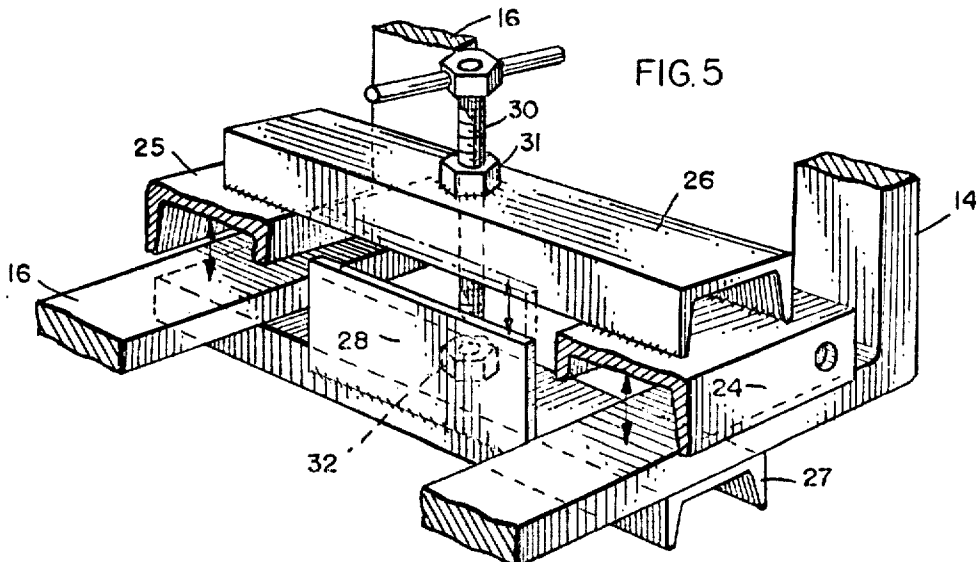
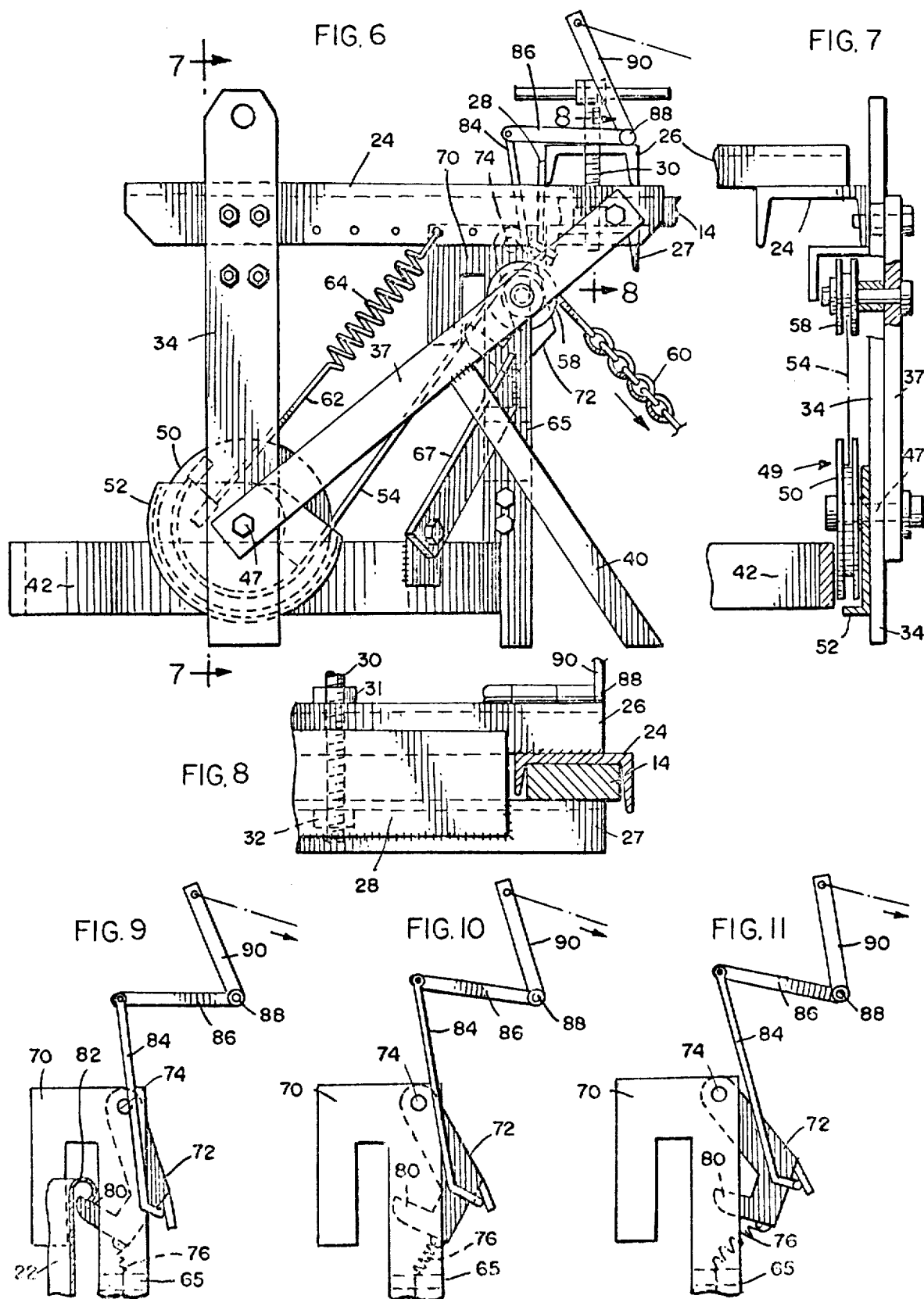


FIG. 5





DRUM DUMPING LIFT TRUCK ATTACHMENT

BACKGROUND OF THE INVENTION

This invention relates to a mechanism for lifting and dumping containers wherein the mechanism may be utilized in combination with the fork lift of a lift truck or the like.

Often in foundries and other industrial settings, materials are transported or stored in containers such as barrels. During the particular industrial operation involved, not only is it desirable to transport the barrel from one site to another, but also it is desirable to dump the container contents into, perhaps, still another container. Of course, transportation of containers in industrial settings is often accomplished by the well-known fork lift truck or an equivalent apparatus.

Thus, it is desirable to provide a mechanism which may be utilized in combination with a fork lift truck to assist in the transportation of a container and also provide a means for dumping the container at a desirable location. Such a mechanism should be easily incorporated with a fork lift. It should also be easily removable, economical to manufacture and be simply constructed to facilitate easy replacement and repair.

SUMMARY OF THE INVENTION

In a principal aspect, the present invention comprises a mechanism which may be utilized in combination with the fork lift of a lift truck to carry and dump containers. The mechanism includes a frame with pivotal container gripping means attached thereto. The frame is attached to the fork lift and the pivotal gripping means pivots to dump the container as the fork lift is raised beyond a predetermined height.

Thus, it is an object of the present invention to provide an improved mechanism for transporting and dumping containers.

It is a further object of the present invention to provide a mechanism for transporting and dumping containers which mechanism may be attached and used in combination with a fork lift of a lift truck.

Still another object of the present invention is to provide a container dumping mechanism which grips a container and when raised to a desirable height pivots the container about an axis substantially parallel to the ground to thereby dump the contents of the container at a desired position.

Still another object of the present invention is to provide a mechanism which may be easily attached and detached from the fork lift of a lift truck.

These and other objects, advantages and features of the present invention will be set forth in a detailed description which follows.

BRIEF DESCRIPTION OF THE DRAWING

In the detailed description which follows, reference will be made to the drawing comprised of the following figures:

FIG. 1 is a perspective view of a typical lift truck in combination with the mechanism of the present invention;

FIG. 2 is a perspective view of the mechanism of the present invention with a container mounted therein, the container being partially pivoted to dump the contents thereof;

FIG. 3 is another perspective view of the mechanism of the invention wherein the container is pivoted so that the contents will be dumped therefrom;

FIG. 4 is an enlarged perspective view of the mechanism of the present invention;

FIG. 5 is an enlarged partial perspective view of the clamping means utilized to attach the mechanism of the present invention to a fork lift;

FIG. 6 is a side view of the mechanism of the present invention;

FIG. 7 is a cross-sectional view of the mechanism of the invention taken substantially along the line 7—7 in FIG. 6;

FIG. 8 is another cross-sectional view of the clamp mechanism taken substantially along the line 8—8 in FIG. 6;

FIG. 9 is an enlarged side view of the means for detaching the container gripping means associated with the mechanism of the invention;

FIG. 10 is the means of FIG. 9 in a second partially disengaged position; and

FIG. 11 is the means of FIG. 9 in a completely disengaged position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Reference is first directed to FIG. 1 which illustrates a typical fork lift truck 10. This fork lift truck 10 includes a front end lift mechanism 12 that has a movable fork lift comprised of first and second outwardly extending fork members 14 and 16 as also illustrated in FIGS. 2 and 3. The fork members 14 and 16 are attached to parallel cross bars 17 and 18. The cross bars 17 and 18 slide on rails 19 and 20 and are driven vertically by means of a drive chain 21. Typically, this is the manner for operation of a fork lift mechanism 12 associated with a fork lift truck 10.

The apparatus of the present invention comprises the container or drum dumping mechanism 23 in FIG. 1 attached to the fork members 14 and 16. In FIG. 1, this mechanism 23 of the present invention is shown positioned over a 55 gallon drum 22. The mechanism 23 can be lowered onto the drum 22 for attachment thereto and subsequent dumping by the sequence of steps illustrated by FIGS. 2 and 3. Reference will therefore be made in the following description to FIGS. 4 through 11 for an initial description of the structure of the mechanism 23 of the present invention. Following that, FIGS. 1, 2 and 3 will be considered in regard to operation of the mechanism 23 of the present invention.

Referring first to FIG. 4, the mechanism 23 of the present invention comprises a frame or bracket which includes first and second channel members 24 and 25. Members 24 and 25 are inverted to fit over the fork members 14 and 16 respectively. The channel members 24 and 25 are spaced from one another and attached together by a cross member 26 as illustrated in FIG. 5. A second cross member 27 cooperates with cross member 26 as shown in FIGS. 5 and 8 to provide a clamping means for attachment of the mechanism 23 of the invention rigidly to the fork members 14 and 16.

That is, the cross member 27 has a guide plate 28 welded thereto. Plate 28 is adapted to extend between the inner faces of the channel members 24 and 25 as illustrated in FIG. 5. A bolt 30 threaded through a nut 31 in cross member 26 may also be threaded into and

through a second nut 32 welded to the cross member 27. This will draw the member 27 toward the member 26 with the guide plate 28 acting to maintain the alignment of the member 27 relative to the member 26. Of course, the members 24 and 25 are maintained in an aligned position by virtue of their channel construction which permits them to be fitted over the fork members 14 and 16 as shown in FIG. 8. In this manner, the mechanism 23 of the present invention can be tightly attached to the fork members 14 and 16 so that it will not slip therefrom.

Attached to the forward end of each of the channel members 24 and 25 is a single downwardly extending arm 34 and 35 respectively. The arms 34 and 35 are held in a substantially vertical position by means of a brace 37 and 38 extending respectively between the arm 34 and channel member 24 and arm 35 and channel member 25. Container guide members 40 and 42 extend outward and downward from the braces 37 and 38 respectively.

A circular member or container grasping ring 42 is pivotally attached to the lower end of arms 34 and 35 so that it can pivot about an axis substantially parallel with the ground. That is, a pivot shaft 44 extends through an appropriate opening in a bracket 45 welded to circular member 42 and further extends through arm 35 and brace 38. On the opposite side of the circular member 42 a pivot shaft 47 extends through brace 37, arm 34 and connects to a lever arm mechanism 49. Mechanism 49 is rigidly attached to the circular member 42.

The lever arm mechanism 49 is also illustrated in FIGS. 6 and 7. Mechanism 49 includes a pulley wheel 50 which is rigidly attached to ring member 42 as well as shaft 47. Thus, as illustrated in FIG. 6, the pulley wheel 50 rotates coincidentally with circular member 42. Simultaneously, shaft 47 can freely pivot within arm 34 and brace 37. A shield 52 is welded to the arm 34 so that the pulley wheel 50 may freely rotate within the protective surface defined by the shield 52.

A cable 54 is fitted in a groove 56 of the pulley wheel 50 and attached to the side of the pulley wheel 50 along a radius of wheel 50 at a first lever arm distance from axis of shaft 47 as illustrated in FIG. 6. The cable 54 passes through the groove 56 over an idler wheel or pulley 58 attached to brace 37 and connects with a chain 60 as illustrated in FIG. 6.

A second cable 62 is also fastened to the pulley wheel 50 along the same radius from the shaft 47 as defined by the point of attachment of the cable 54 to the pulley wheel 50. Cable 62 is attached to a spring 64 which has its opposite end attached to arm 24. Thus, the cable 62 tends to oppose rotation of the pulley 50 in a counterclockwise sense as illustrated in FIG. 4. The static or rest position of the pulley wheel 50 is illustrated in FIG. 4, however. Rotation in the counterclockwise sense is provided by pulling cable 54. In this manner, the circular member 42 is made to pivot about the axis defined by the shafts 44 and 47. Thus, referring to FIG. 6, the circular member 42 will tend to be pivoted in a counterclockwise direction as the cable 54 overcomes the tension force resulting from the spring 64.

A container gripping means is attached to the circular 42 to form a container support frame. This means is illustrated most clearly in FIGS. 6 and 9-10. The gripping means includes a pair of parallel, upright support members 65 and 66 extending vertically upward

from the circular member 42. Side braces or brackets 67 and 68 hold the support members 65 and 66 in a fixed position relative to the circular member 42. The bolts attaching the side brackets 67 and 68 may be removed so that the support members 65 and 66 can be detached from the circular member 42 and replaced by a substitute support member of different configuration or length as required.

The support members 65 and 66 include hooked upper ends 70 and 71, respectively, as illustrated in FIGS. 2, 3 and 9-11, comprising a first, or top rim holding element. Ends 70 and 71 are spaced from the support members 65 and 66 respectively. As the support members 65 and 66 are comprised of spaced, parallel plates, a rim gripping member 72, comprising a second, or bottom, rim holding elements, is slidably inserted therebetween. The rim gripping member 72 is inserted between the support member plates 65 and 66, as illustrated in FIGS. 4, 6 and 9-11.

Referring to FIGS. 9-11, the rim gripping member 72 is hooked shaped and pivots about a shaft 74 extending between support member 65 and 66. As explained above, the support members 65 and 66 have hooked or downwardly extending upper ends 70 and 71 which are spaced from the main support members 65 and 66. Thus, the upper ends 70 and 71 may fit on the inside of a drum 22 or other container. Simultaneously, the rim gripping member 72 is biased in a clockwise sense about the shaft 74 by a spring 76 which is attached to the support members 65 and 66. Thus, the rim gripping member 72 which has a hooked end 80 engages the upper rim 82 of the drum 22. In this manner, the drum 22 is locked firmly and held firmly against the upper end 70. It cannot slide from the circular member 42 as the fork members 14 and 16 and thus the drum 22 are raised.

Referring now to FIGS. 9-11 and also FIGS. 4 and 6, there is illustrated the construction and operation of means for disengaging the rim gripping member 72 from the rim 82 of drum 22. This means includes a metal stirrup 84 which is attached to a first lever arm 86. The lever arm 86 is fixed to a shaft 88 mounted on the cross member 26. A second lever arm 90 can be manually moved in a clockwise sense to cause the stirrup 84 to be translated upward as illustrated in FIGS. 10 and 11. This raises the rim gripping member 72 against the force of the spring 76 causing the rim gripping member 72 to become disengaged from the rim 82 of the drum 22.

Reference is now directed to FIGS. 1, 2 and 3 for a description of the operation of the mechanism of the invention. First, the circular member 42 is positioned over the drum 22 as illustrated in FIG. 1. The fork members 14 and 16 on the mechanism 23 are lowered so that the circular member 42 fits about the girth of the drum 22. As the circular member 42 is lowered, the front ends 70 and 71 of the bracket members 65 and 66 fit over the inside of the rim 82. The rim gripping member 72 and, in particular, the hooked end 80 engage the rim 82 as shown in FIG. 9. The fork members 14 and 16 may then be raised to simultaneously raise the drum 22.

The chain 60 is attached to the truck 10. Thus, the length of the chain 60 from the point where it is attached to the pulley wheel 50 to the attachment point on the truck 10 is a fixed length. As the mechanism 23 of the invention with the attached drum 22 is lifted, the

chain 60 pulls and pivots the pulley wheel 50 against the constraining force of the spring 64. As the mechanism 23 is raised higher and higher, the pulling of the chain 60 causes the drum 22 to be rotated or pivoted in the sequence illustrated by FIG. 2 and FIG. 3 to thereby dump the contents of the drum 22. The hooked upper ends 70 and 71 prevent the drum 22 from falling from the mechanism 23.

While in the foregoing there has been set forth a preferred embodiment of the present invention, it is to be understood that the invention shall be limited only by the following claims and their equivalents.

What is claimed is:

1. Apparatus for attachment to the lifting element of a lift truck mechanism for holding and dumping an open-top container having a top rim, comprising:
 - a. a bracket,
 - b. means for detachably attaching said bracket to the lifting element of a lift truck mechanism,
 - c. a container support frame adapted to receive and support an open-top container,
 - d. journal means supporting said support frame on said bracket for rotational movement about a substantially horizontal axis between an upright position and dumping position, said journal means being supported below said lifting element of said lift truck mechanism,
 - e. lever means on said container support frame for rotating said support frame relative to said bracket,
 - f. said container support frame comprising a circumferential member and rim gripping means,
 - g. said rim gripping means having a pair of cooperating holding elements adapted to releasably hold one side of the top rim of an open-top container received within said container support frame,
 - h. said circumferential member comprising at least a bearing portion spaced on the opposite side of a container received in said support frame from said rim gripping means and spaced below said rim gripping means when said support frame is in said upright position,
 - i. said circumferential member being adapted to, upon lowering, loosely position a container within said support frame in said upright position, said bearing portion being adapted to engage the opposite side of the container from the side gripped by said gripping means and bear a portion of the weight of said container when said support frame is rotated to said dumping position.
2. The invention according to claim 1 in which said journal means is mounted on said bracket and supports said circumferential member for rotational movement, said lever means being fixed to said circumferential member, cable means for actuating said lever means to rotate said circumferential member, and biasing means

connected to said circumferential member to normally restore said container support frame to said upright position in the absence of any force exerted upon said cable means.

3. The invention according to claim 2 in which said cable means comprises a cable, one end of which is connected to a point on said container support frame radially spaced from the rotational axis of said journal means, and means for attaching the other end of said cable to a stationary portion of the lift truck mechanism to which said bracket is attached, whereby continued upward movement of said bracket relative to said lift truck mechanism, past the height at which said cable is taut, causes said container support frame to rotate toward said dumping position.
4. The invention according to claim 1 in which said circumferential member is ring-shaped, and said gripping means comprises a standard fixed to and projecting upward from said ring-shaped member on the opposite side from said bearing portion, said holding elements being operatively mounted on said standard.
5. The invention according to claim 4 in which said gripping means further comprise operative means supporting said holding elements for automatically receiving and holding the top rim of one side of a container positioned within said support frame, and actuator means for relatively moving said holding elements to release said top rim.
6. The invention according to claim 5 in which one of said holding elements comprises a first, downwardly opening, hook member formed at the top of said standard for fitting over the top rim of an open-top container received within said container support frame, said other holding element comprises a second upwardly directed, hook member journaled on said standard to move below said first hook member and beneath the top rim of said container to hold said top rim, and to move away from said first hook member to release said top rim.
7. The invention according to claim 6 in which said actuator means for releasing said holding elements comprises a lever mechanism cooperatively engaging said pivotal second hook member, and means for actuating said lever mechanism to move said second hook member away from said first hook member and from beneath the top rim of a container received in said container support frame.
8. The invention according to claim 1 in which said bracket comprises clamp means for detachable attachment to the forks of a fork lift truck mechanism, stationary arms depending from said clamp means, said journal means being mounted on said depending arms below said clamp means.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,893,579

Dated July 8, 1975

Inventor(s) Vern K. Glewwe

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet, in item 73 "Doyier" should
read -- Dozier --.

Signed and Sealed this

ninth Day of September 1975

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks