United States Patent

Dunbar

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[54] CONTAINER HANDLING APPARATUS

[72] Inventor: **Glenn G. Dunbar,** 2608 Overlook Drive, Toledo, Ohio 43614

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[52] **U.S. Cl.** **214/313,** 294/88

[51] **Int. Cl.** **B65g 7/00**

[58] **Field of Search** ..... 214/313, 314, 652, 658, 1 QD; 294/88

[56] **References Cited**

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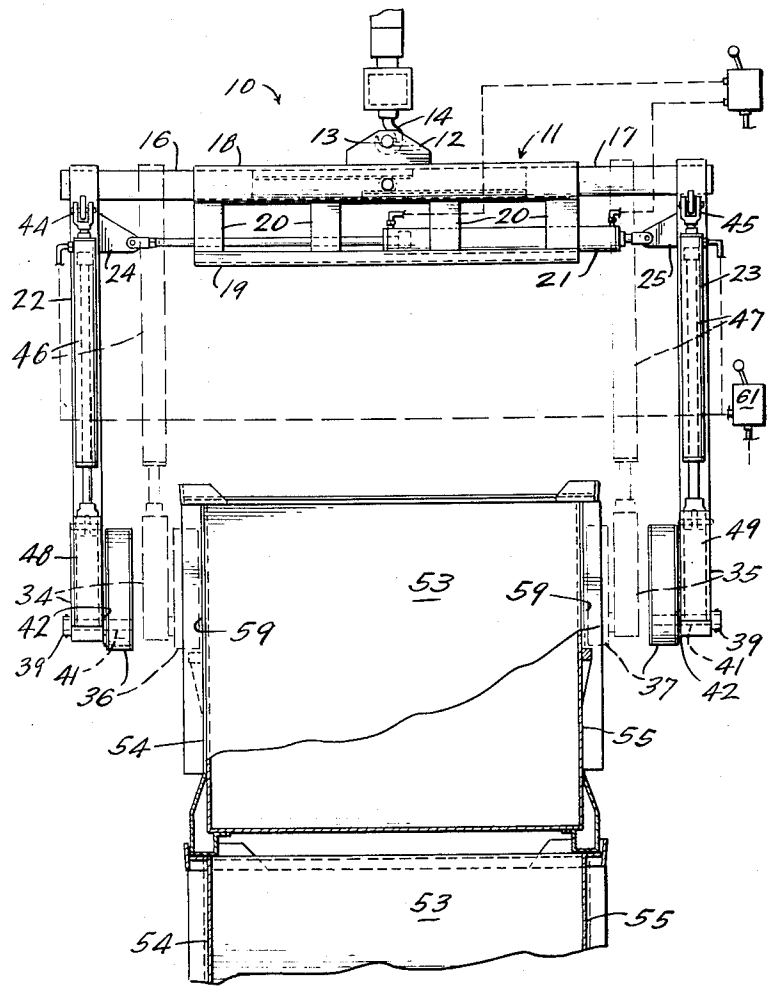
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Primary Examiner—Robert G. Sheridan
Assistant Examiner—Lawrence J. Oresky
Attorney—Owen & Owen

[57] **ABSTRACT**

This invention relates to a container handling apparatus for use with a container having opposed geometrically enclosed female members on its sidewalls. Two opposed shoulder members extend outwardly from a support frame. A cylinder and guiding mechanism equally and simultaneously move the shoulder members. A depending arm is attached to each of the shoulder members and a rotatable male engaging member is connected to the distal end of each of the depending arms. The male engaging members have a shape complementary with the enclosed female members and power cylinders are provided for rotating the male engaging members.

3 Claims, 10 Drawing Figures



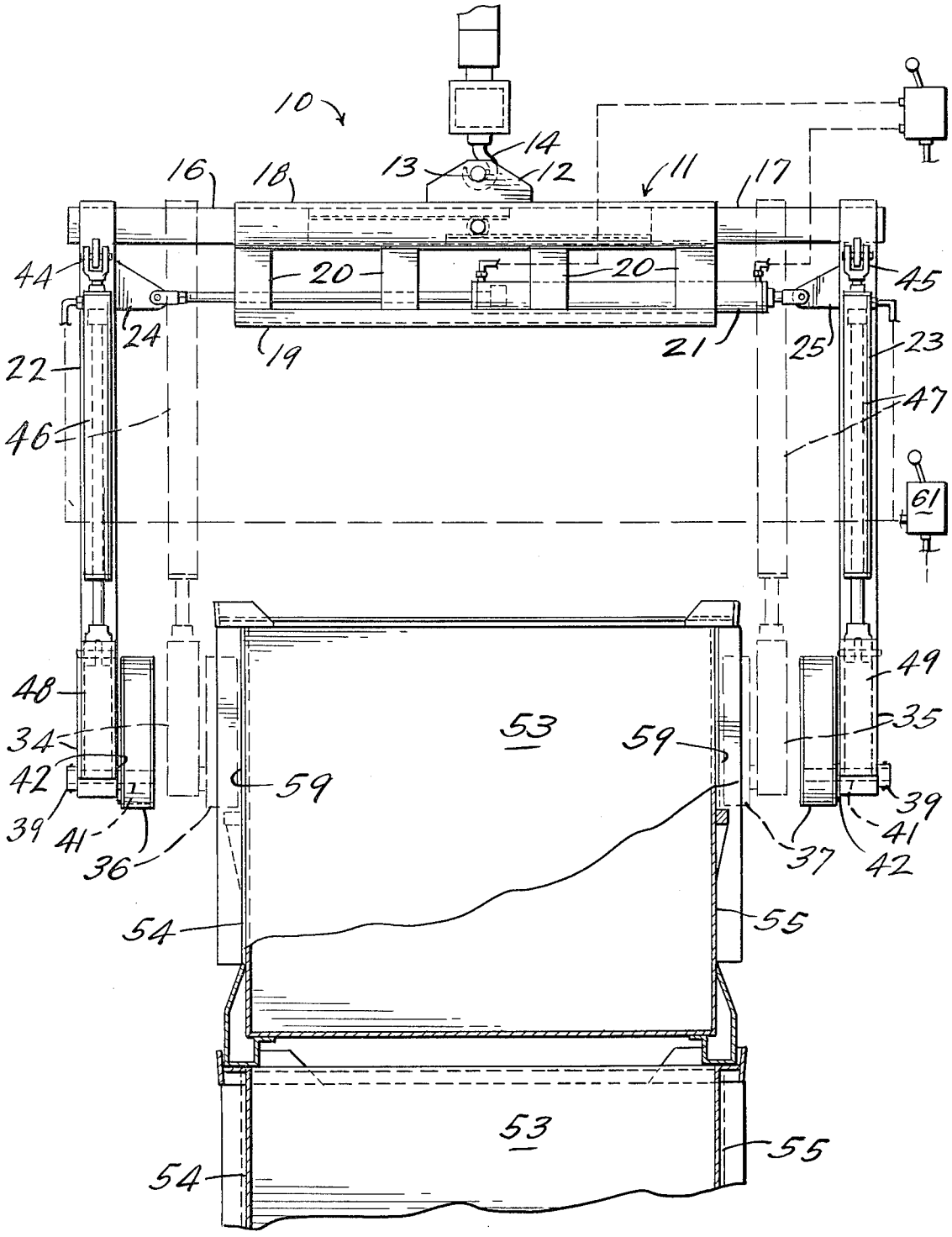


FIG-1-

INVENTOR:
GLENN G. DUNBAR.
BY Owen & Owen
ATT'YS.

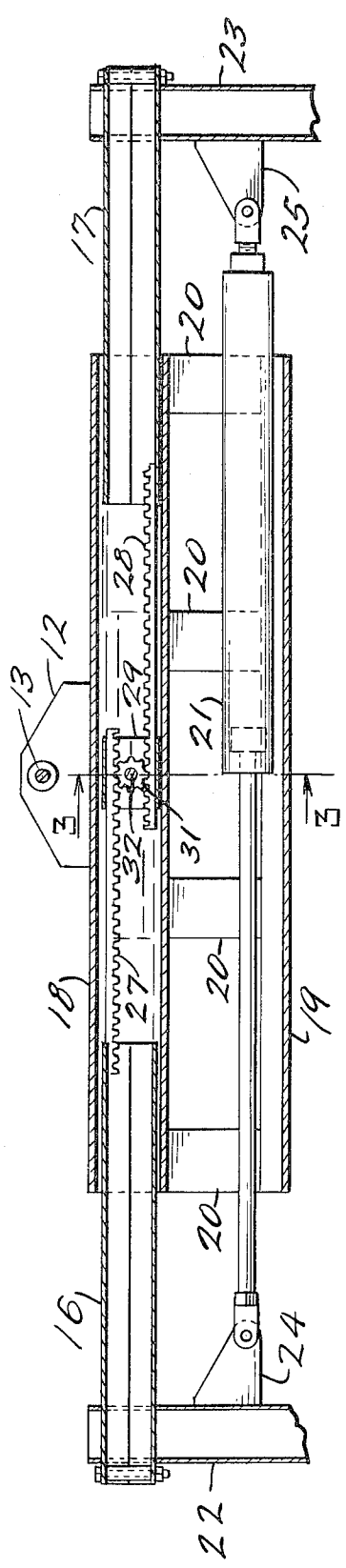


FIG-2-

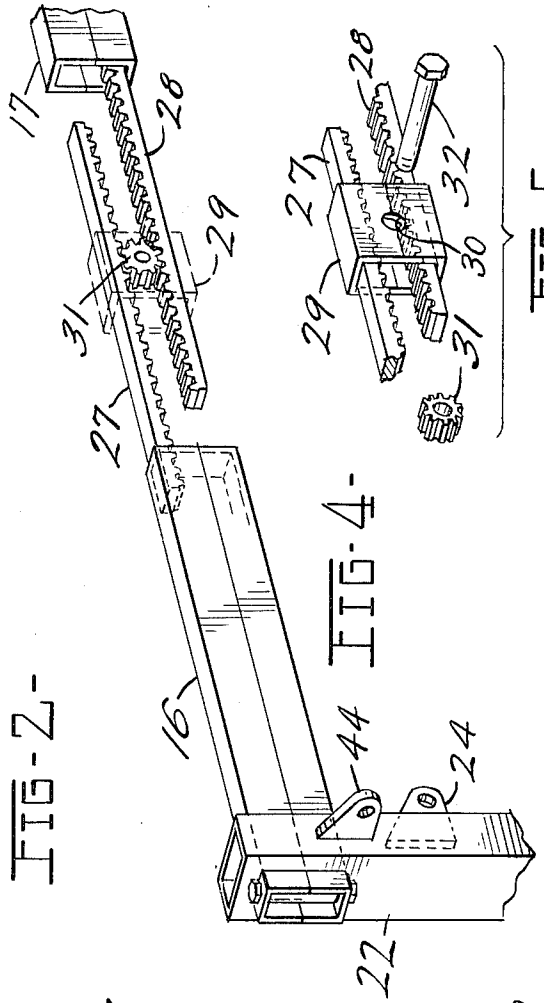


FIG-4-

FIG-5-

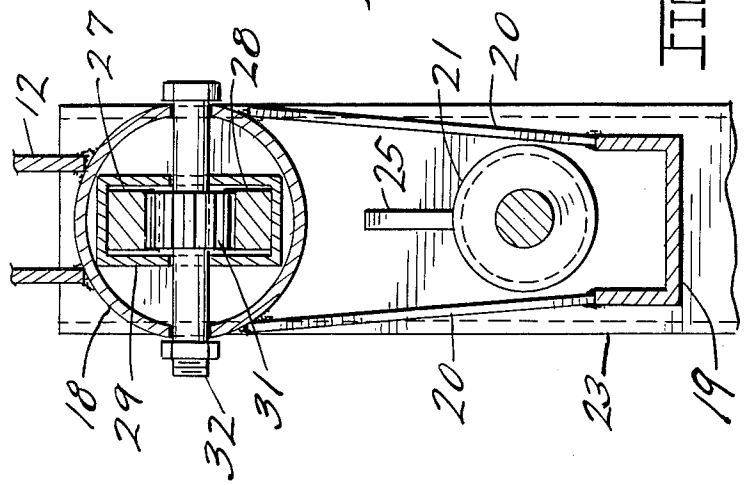


FIG-3-

INVENTOR:
GLENN G. DUNBAR.
BY
Owen & Owen
ATT'YS

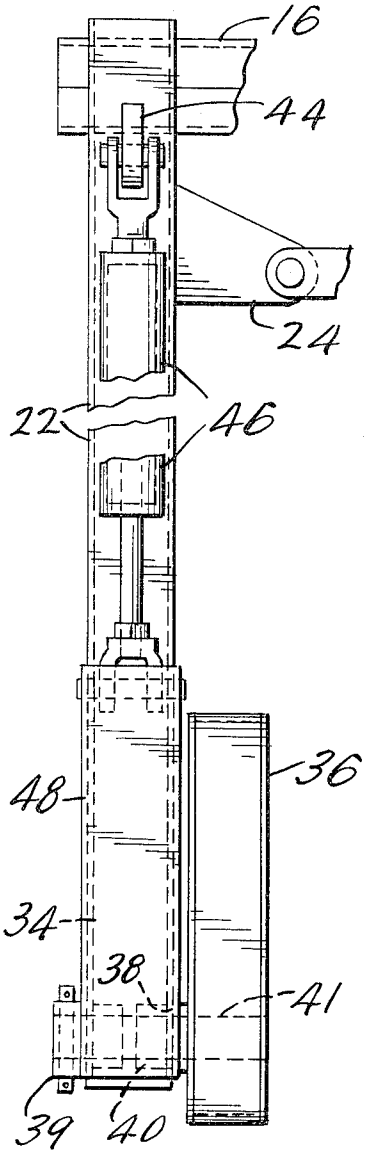


FIG-6-

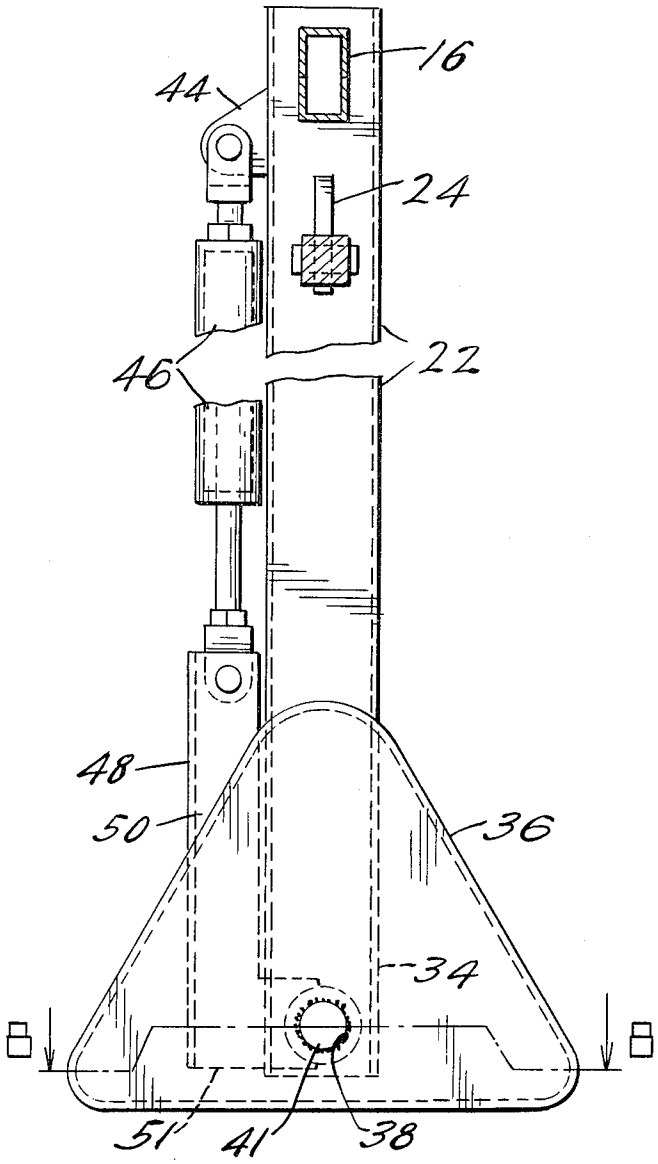


FIG-7-

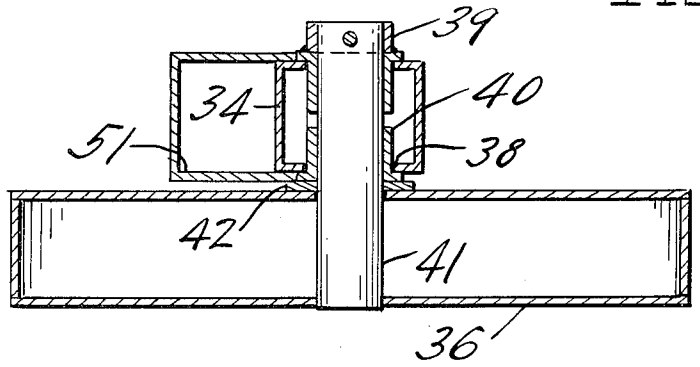


FIG-8-

INVENTOR:
GLENN G. DUNBAR.
BY
Owen & Owen
ATT'YS.

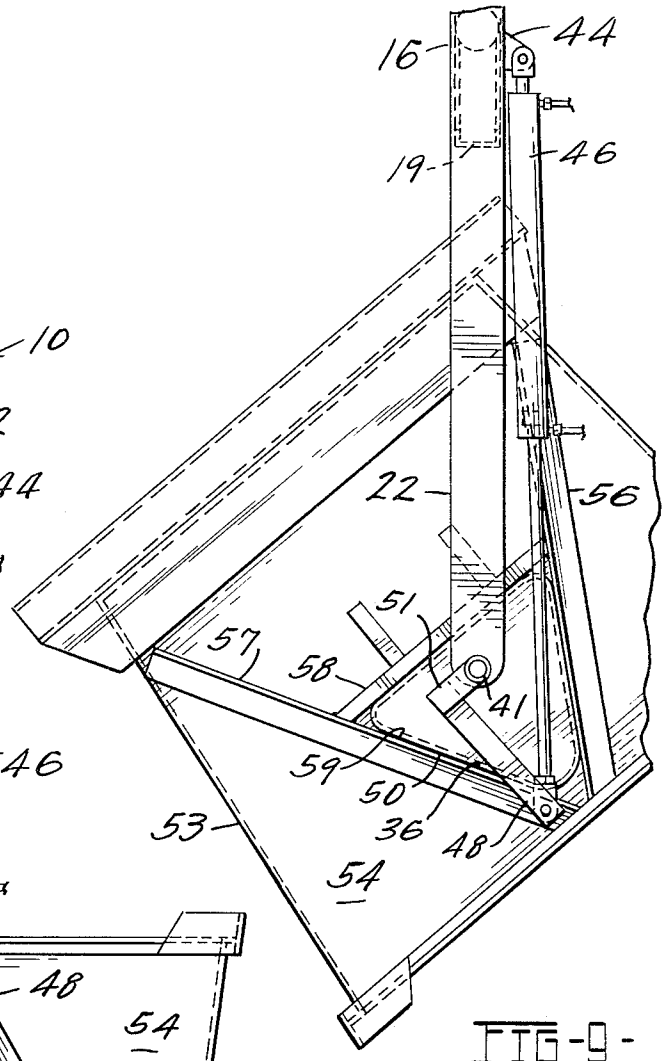


FIG-9-

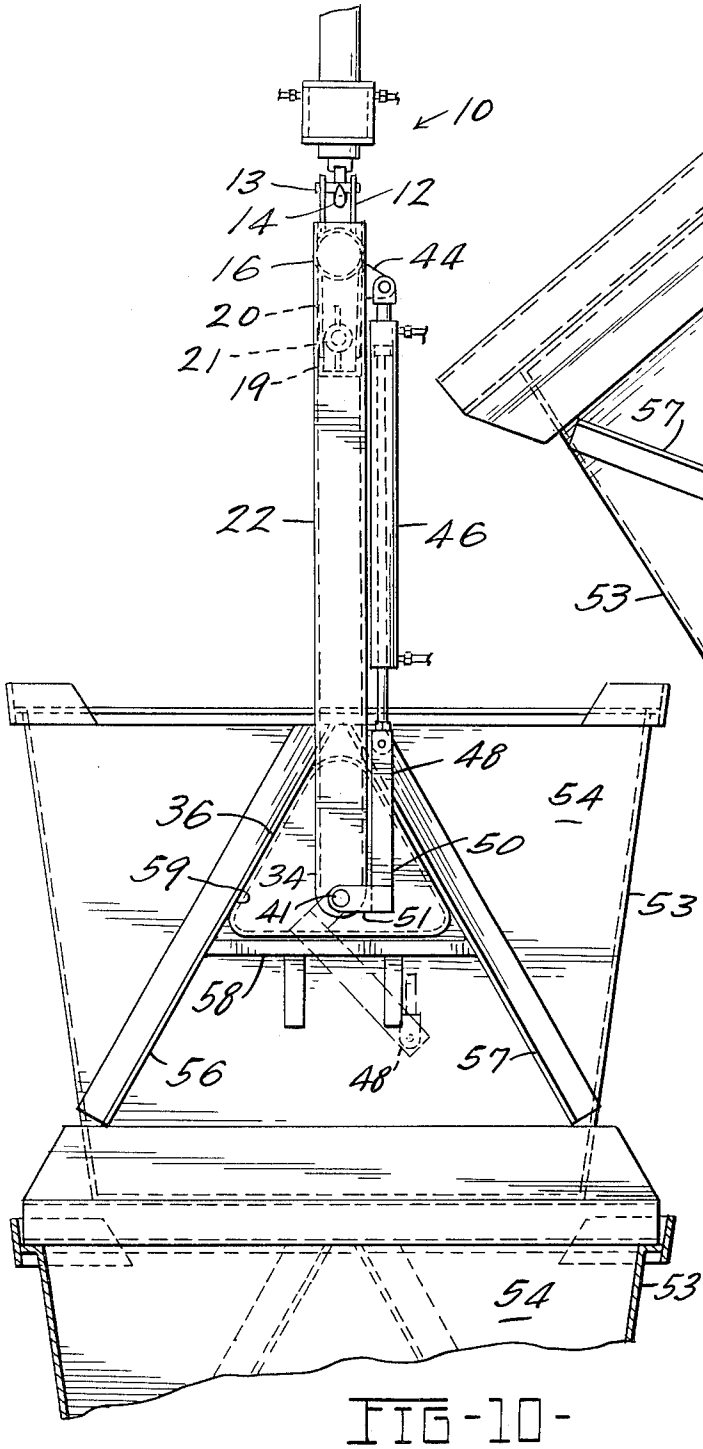


FIG-10-

INVENTOR:
GLENN G. DUNBAR.
BY
Owen & Owen
ATT'YS.

CONTAINER HANDLING APPARATUS

BACKGROUND OF THE INVENTION

The handling of containers, for example factory waste containers, has been a problem. If truck mounted units, for example fork lift trucks, are utilized they often create a safety hazard. On the other hand, if a standard chain hoist is utilized, it is very difficult to discharge the contents of the container.

Furthermore, in a construction yard situation container handling equipment should be quick, efficient and relatively inexpensive.

SUMMARY OF THE INVENTION

The present invention provides a container handling apparatus which is suitable for use in a factory in connection with, for example, a chain hoist or alternatively in a yard in connection with, for example, a truck mounted yard crane.

A container handling apparatus, according to the present invention, includes a longitudinally extending support frame. Two opposed shoulder members extend outwardly from the support frame and guiding means are provided for equally and simultaneously moving said opposed shoulder members inwardly and outwardly relative to the support frame. A depending arm is attached to each of the shoulder members and a rotatable male engaging member is operatively connected adjacent the distal end of each of the depending arms. The male engaging members have a shape complementary with the enclosed female members which are mounted on the sidewalls of the container and power means are provided for rotating the male engaging members.

It is the primary object of the present invention to provide container handling apparatus for the moving and dumping of large containers. It is another object of the present invention to provide apparatus for lifting, moving and emptying containers of various sizes.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view of a container handling apparatus according to the present invention and showing a pair of superposed movable containers;

FIG. 2 is a fragmentary, cross-sectional view of the upper portion of the apparatus;

FIG. 3 is a cross-sectional view taken along line 3—3 of FIG. 2 and shown on an enlarged scale;

FIG. 4 is a perspective view of the upper portion of the apparatus;

FIG. 5 is an exploded view of a rack and pinion mechanism;

FIG. 6 is a fragmentary, elevational view of a depending arm of the apparatus;

FIG. 7 is a side view of the depending arm shown in FIG. 6;

FIG. 8 is a cross-sectional view taken along line 8—8 of FIG. 7;

FIG. 9 is a fragmentary, side view of the depending arm of the apparatus and showing a movable container in an inverted position; and

FIG. 10 is a fragmentary, side view of the depending arm of the apparatus, similar to FIG. 9, with the movable container in an upright position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A container handling apparatus, according to the present invention, is generally indicated in the drawings by the reference number **10**. The container handling apparatus **10** includes a longitudinally extending support frame **11** which preferably has an attaching bracket **12** located at its midpoint. The attaching bracket **12** includes a lifting rod **13** (see FIG. **10**) which is suitable for engagement by a lifting hook **14** of, for example, a chain hoist or a yard crane.

A pair of opposed shoulder members **16** and **17** extend outwardly from the support frame **11**. In the present embodiment, the support frame **11** includes an upper tubular member **18** which receives and guides the two opposed shoulder members

16 and **17**. (See FIG. **3**) The shoulder members **16** and **17** are constructed of channels which are welded together forming a rectangular cross section (see FIG. **4**). The support frame **11** also includes a bottom channel support **19** which is supported below the upper tubular member **18** by a plurality of side plates **20**. A cylinder **21** is positioned on the bottom channel support **19**. Components of the cylinder **21** are free to move with respect to the bottom channel support **19**. A depending arm **22** is mounted on the outer end of the shoulder member **16** and, in like manner, a depending arm **23** is mounted on the outer end of the shoulder member **17**. A mounting bracket **24** is fixed to the depending arm **22** and a mounting bracket **25** is fixed to the depending arm **23**. The cylinder **21** is connected between the brackets **24** and **25**.

Referring specifically to FIGS. **2–5**, a geared rack **27** is mounted on the shoulder member **16** and extends inwardly. Similarly, a geared rack **28** is mounted in an opposed manner on the shoulder member **17** and also extends inwardly. Referring to FIG. **5**, a rectangular mounting box **29** having a transverse opening **30** is welded or otherwise affixed to the midpoint of the upper tubular member **18**. An idler pinion **31** is mounted for rotation within the box **29** by a pin **32** which extends through the opening **30**. The teeth of the idler pinion **31** mesh with the teeth of the opposed geared racks **27** and **28**. Therefore, when the cylinder **21** is actuated, any movement of the shoulder member **16** and its rack **27** results in an equal and opposite movement of the opposed shoulder **17** and its rack **28**. Therefore, the idler pinion **31** and its associated racks **27** and **28** serve as part of the guiding means for equally and simultaneously moving the opposed shoulder members **16** and **17** inwardly and outwardly relative to the support frame **11**.

The arm **22** has a distal end **34** and the arm **23** has a distal end **35**. A triangularly shaped male engaging member **36** is mounted for rotation adjacent the distal end **34** and a male engaging member **37** is mounted for rotation adjacent the distal end **35**.

Referring specifically to FIGS. **6–8**, the distal end **34** of the depending arm **22** has an opening **38** (see FIG. **8**) which receives sleeves **39** and **40**. A shaft **41** extends through the sleeves **39** and **40** and the sleeves **39** and **40** are pinned or otherwise affixed to the shaft **41**. The male engaging member **36** is fixably mounted adjacent the inner end of the shaft **41**. The male engaging member **36** is spaced from the sleeve **40** by a spacer washer **42**. The male engaging member **37** is mounted on the distal end **35** of the depending arm **23** in a similar manner.

Mounting brackets **44** and **45** are provided adjacent the upper end of the arms **22** and **23**. A cylinder **46** is connected to the mounting bracket **44** and a cylinder **47** is connected to the mounting bracket **45**. Referring to FIGS. **6** and **7**, the lower end of the cylinder **46** is connected to a crank member **48**. In a similar manner, the lowermost end of the cylinder **47** is connected to a crank member **49**. The crank members **48** and **49** are operatively connected to the rotatable male engaging members **36** and **37**, respectively.

More specifically, the crank member **48** has an upper leg section **50** (see FIG. **7**) and a perpendicular lower leg section **51**. The leg section **51** is welded or otherwise fixed to the sleeves **39** and **40**.

The cylinders **46** and **47** act as power means to rotate the male engaging members **36** and **37**. Referring to FIGS. **6**, **7** and **8**, when the cylinder **46** is extended or retracted, force is transferred to the crank member **48**. The cylinder force, acting through its leg section **51**, rotates the sleeves **39** and **40** which are pinned to the shaft **41**. The triangular shaped male engaging member **36** rotates with the shaft **41**. The male engaging member **37** is rotated in a similar manner.

Referring to FIGS. **1**, **9** and **10** a container **53**, suitable for use with the container handling apparatus **10**, is shown. The container **53** has opposed sidewalls **54** and **55**. A pair of converging angle members **56** and **57** are mounted on the opposed sidewalls **54** and **55**. A bottom member **58** extends between the angle members **56** and **57**. The angle members **56**

and 57 together with the bottom member 58 form an enclosed female member 59. In the present embodiment, the geometrically enclosed female members 59 are triangular in shape, however, other types of geometric shapes may be utilized, for example, pentagonal shapes.

In a typical operation, the container handling apparatus 10 is moved into position over the container 53. The cylinder 21 is extended and the depending arms 22 and 23 assume the solid line position shown in FIG. 1. The cylinder 21 is then retracted. The rotatable male engaging members 36 and 37 move inwardly and are received by the enclosed female members 59, as shown by the dashed lines in FIG. 1. The hoist, chain lift or other lifting means moves the container 53 to a discharge location. At that time an actuator 61 (shown diagrammatically in FIG. 1), which is operatively connected to the cylinders 46 and 47, is energized and the cylinders 46 and 47 are extended. Extension of the cylinders 46 and 47 rotates the respective crank members 48 and 49 to the position shown in FIG. 9. When in this position, the contents of the container 53 fall outwardly under the force of gravity, however, the container 53 is restrained from falling by the mating relationship of the rotatable male engaging members 36 and 37 and the respective female members 59. After the contents have been removed from the container 53 the cylinders 46 and 47 are retracted and the container 53 assumes its upright position, shown in FIG. 10. At this time, the cylinder 21 is extended and the rotatable male engaging members 36 and 37 are moved outwardly from the female members 59.

It has been found that a container handling apparatus, constructed according to the present invention, provides a very efficient structure for the handling of container borne materials.

What I claim is:

1. A container moving and dumping apparatus for use with a movable container having opposed female members on its sidewalls, each of the female members comprising a triangularly enclosed receptacle, said apparatus comprising a longitudinally extending support frame, two opposed shoulder members extending outwardly from said support frame, said support frame including channel means for supporting and guiding said opposed shoulder members, means for equally and simultaneously moving said opposed shoulder members inwardly and outwardly relative to said support frame, said means including a geared rack connected to each of said shoulder members, an idler pinion mounted on said channel means adjacent said geared racks, said geared racks riding equally and oppositely relative to said idler pinion for equally and simultaneously moving said opposed shoulder members relative to said support frame and cylinder means for moving said shoulder members, a depending arm attached to each of said shoulder members, a triangular shaped male engaging member pivotally connected adjacent the distal end of each of said depending arms, said male engaging members being movable into and out of the female members of the container, power means for rotating said male engaging member, and a crank member operatively connected between each of said rotatable male engaging members and the distal end of a respective one of said depending arms, said power means comprising a cylinder operatively connected to one of said cranks for rotating the respective male engaging member.

2. A container moving and dumping apparatus, according to claim 1, including actuating means operatively connected to said power means for equal and simultaneous rotation of said male engaging members.

3. A container moving and dumping apparatus according to claim 1, wherein said cylinder means includes a cylinder operatively connected to each of said depending arms for operatively moving said opposed shoulder members relative to said support frame.

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