Sept. 6, 1966 T. E. ORD 3,270,901

TRANSPORTING AND DUMPING DEVICE

Filed Feb. 17, 1964 3 Sheets-Sheet 1

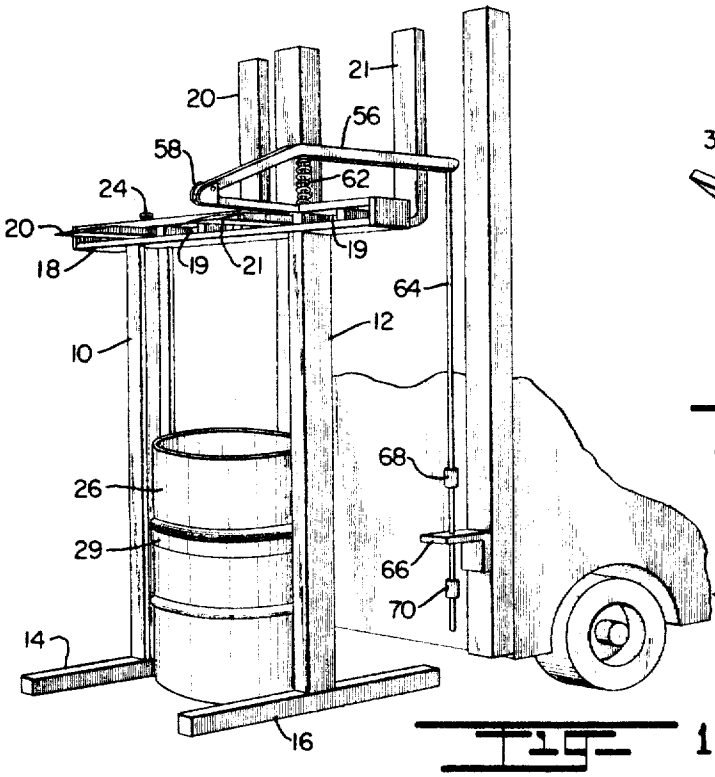

FIG. 1

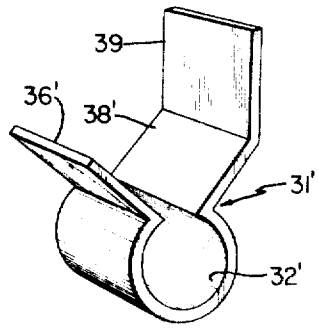

FIG. 9

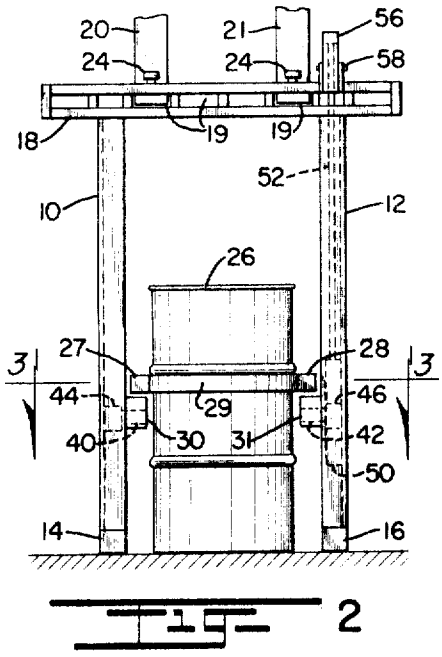

FIG. 2

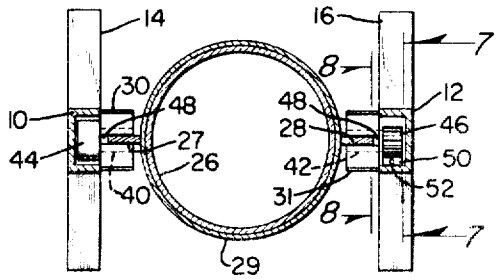

FIG. 3

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TRANSPORTING AND DUMPING DEVICE

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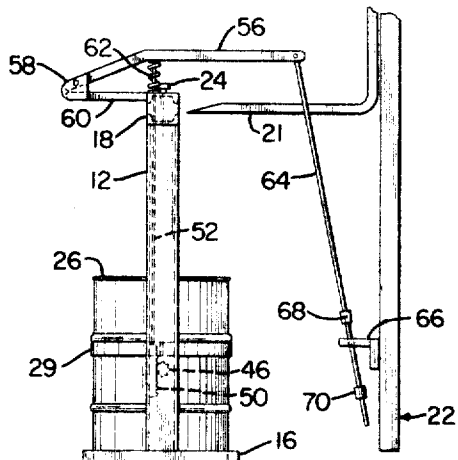

FIG. 4

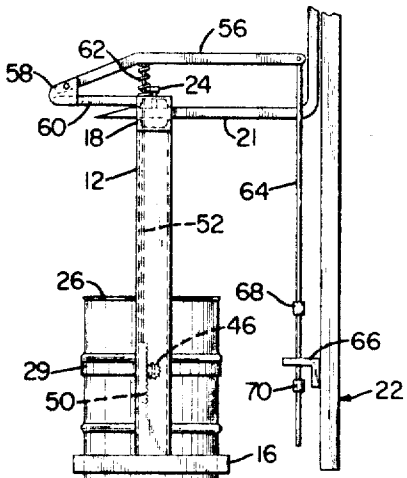

FIG. 5

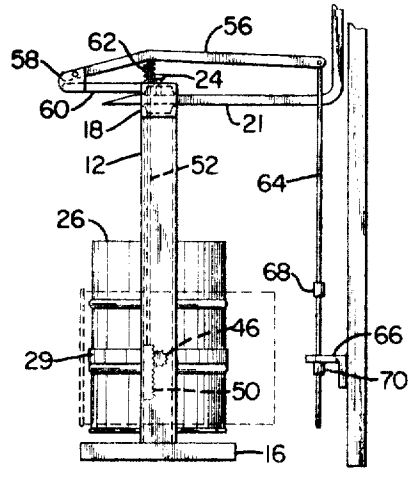

FIG. 6

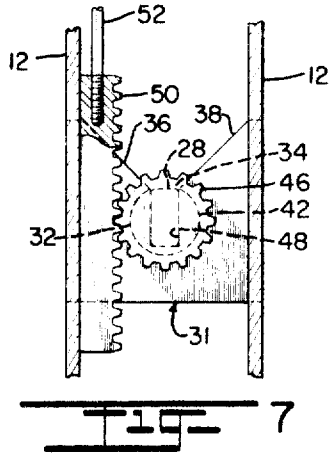

FIG. 7

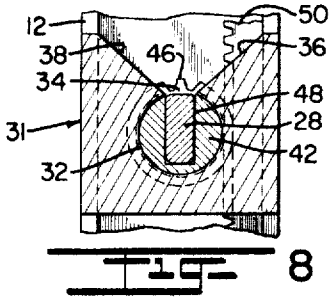

FIG. 8

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TRANSPORTING AND DUMPING DEVICE

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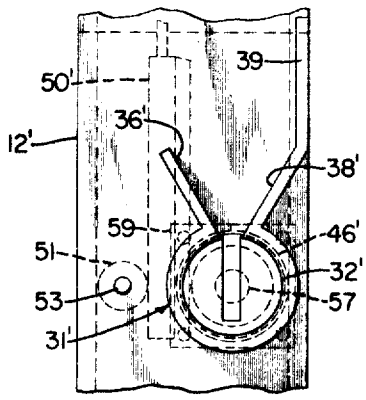

FIG. 10

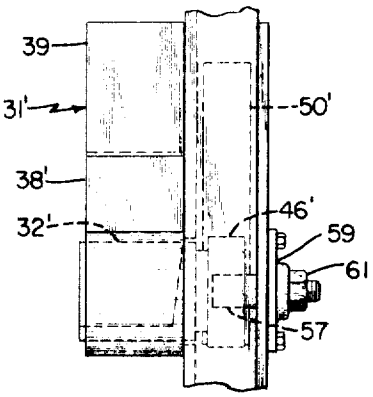

FIG. 11

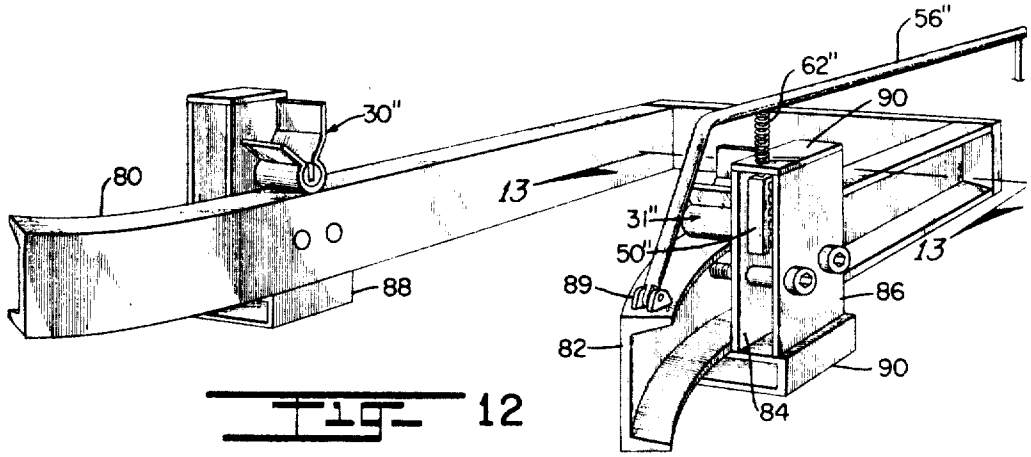

FIG. 12

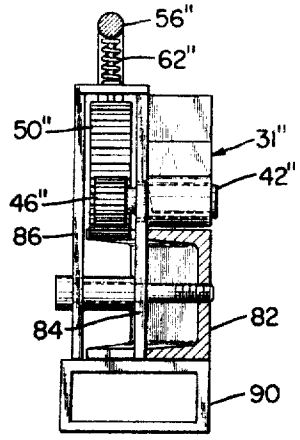

FIG. 13

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Patented Sept. 6, 1966

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TRANSPORTING AND DUMPING DEVICE

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Filed Feb. 17, 1964, Ser. No. 345,460
19 Claims. (Cl. 214—314)

This invention relates to apparatus for transporting and dumping containers; more particularly, it relates to a device for use in conjunction with fork lift trucks for transporting and dumping containers.

As is well known, it is a widespread practice to cut the heads out of oil drums and use them as garbage containers. This is particularly true in industrial establishments. Other type drums or cans are also used as garbage receptacles. The practice is to dump the drums or other containers into large trash receptacles and reuse the drums indefinitely. In view of the large number of drums in use in this manner, the manner in which these heavily loaded containers are transported and dumped creates a serious problem as respects safety, time and labor involved.

Mechanized devices for transporting the drums to a dumping area and dumping them are available. However, the presently available devices are extremely complicated and expensive. Their complication and consequent tendency to break down creates a repair problem. So far as is known, there are no effective devices for use in combination with fork lift trucks for transporting and dumping garbage cans. While oil drums are used as the garbage can to illustrate the operation of the device of this invention, the transporting and dumping device is not limited to use with oil drums as it can be used with other type refuse or garbage receptacles.

Accordingly, it is an object of this invention to provide a simple and inexpensive device designed for quick attachment to and for use with fork lift trucks for transporting and dumping receptacles.

It is another object of this invention to provide a device of the type stated which is compact in construction and which is adaptable for use with various types of containers.

The transporting and dumping device of the invention comprises in one modification a lifting frame consisting of two uprights or support members with a cross bar at the top and a beam at the bottom of each upright which serves as a foot upon which the frame structure rests. The uprights are preferably of channel construction and one of them is provided with a movable rack engaged by a pinion. The shaft of the pinion is supported in a sleeve-bearing element attached to a support member and having an internal bearing diameter corresponding substantially to the diameter of the pinion shaft. A second sleeve bearing with a cooperating shaft is mounted on the internal face of the other support member. The entrance to the sleeve-bearing members is provided with angularly opposed guide members for barrel lugs. The shafts riding in the sleeve-bearing members are provided with a groove into which diametrically opposed lug members on the barrel fit for transporting the barrel. The guide members serve to guide the lugs into the slots and both guide members may be provided with extensions serving as guides for axially rotating a barrel so that its lugs are properly oriented vertically to permit entry and subsequent seating

thereof in the slots. The cross bar is provided with slots to receive the forks of the fork lift truck for lifting and transporting the device. The barrel is dumped by a lever mechanism anchored on the cross-bar and actuated by the fork lift to provide movement to the movable rack and pinion to invert the barrel 180°. Reverse movement of the rack serves to bring the barrel back to upright position.

In an alternative modification of the invention a horizontally oriented lifting frame with two support members is used in which the rack and pinion are mounted on a support member transverse to it and the lever mechanism for dumping the barrel is preferably supported on top of one of the support members substantially parallel thereto. In this modification the forks of the fork lift truck are positioned underneath the support members parallel thereto and means wider than the frame are provided for receiving fork members.

The invention will now be described in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view of the barrel dumping device in position for lifting the barrel and attached to a fork lift, the fork lift being shown partially;

FIG. 2 is a front view of the device of the invention shown in position for lifting a barrel;

FIG. 3 is a sectional view on lines **3**—**3** of FIG. 2 looking in the directions of the arrows;

FIG. 4 is a side elevational view of the device of the invention shown with the fork lift in position to connect with the dumping device, the fork lift being shown partially;

FIG. 5 is a view similar to FIG. 4 showing the fork lift connected to the dumping device for transporting it;

FIG. 6 is a view similar to FIGS. 4 and 5 showing the barrel in inverted position and showing an intermediate position of the barrel by dotted lines;

FIG. 7 is a partial sectional view taken on line **7**—**7** of FIG. 3;

FIG. 8 is a partial sectional view taken on line **8**—**8** of FIG. 3;

FIG. 9 is a perspective view of an alternative form of sleeve bearing;

FIG. 10 is a partial fragmentary side elevational view of a support member in the area of the rack and pinion showing a modified construction;

FIG. 11 is a view taken ninety degrees to the view of FIG. 10;

FIG. 12 is a perspective view of a modification of the invention in which the lifting frame is horizontally oriented, and

FIG. 13 is a view taken on line **13**—**13** of FIG. 12 looking in the direction of the arrows.

Referring to FIG. 1, the lifting frame of the device of this modification comprises channel-shaped upright support members **10** and **12** supported on feet **14** and **16** and joined together at their top by cross bar **18** provided with slots **19** for receiving the arms or fork members **20** and **21** of the fork lift truck shown partially in phantom and represented by the numeral **22**.

The support members **10** and **12** as well as the feet **14** and **16** and the cross bar **18** may be made of light metal or equivalent material. The support members are preferably of channel shaped cross section. Other means than slots may be provided for attaching the lifting frame to the forks of a fork lift truck. Set screws **24** or other

suitable means may be used for securing the arms **20** and **21** of the fork lift in the slots **19**. If channel shaped support members are used the channel may be facing inwardly or outwardly.

As shown in FIG. 2, the barrel **26** is provided with lifting lugs **27** and **28** attached to the barrel in diametrically opposed positions by any suitable means. One expedient for attaching the lugs is to use a circular removable clamp **29** bearing the lugs. As part of the mechanism for lifting and supporting the barrel, sleeve bearings **30** and **31**, best shown in detail in FIGS. 7 and 8, are secured as by welding to each of the support members **10** and **12**, respectively, at a distance above the feet **14** and **16** so that when the lifting frame is placed over a barrel, the entrance of the sleeve bearings will be below the lifting lugs **27** and **28**. The sleeve bearings may be supported proximate to the support members and the term "adjacent to" includes this arrangement as well as that described above.

As shown in FIGS. 7 and 8, the sleeve bearings are provided with a bore **32**, the surface of which provides a bearing surface, and an inlet **34** with outwardly sloping guide surfaces **36** and **38** leading into the inlet. The sleeve bearings may be made of solid material as shown or may be of strip material bent into the required shape.

An alternative form of sleeve bearing **31'** is shown in FIG. 9, preferably made from a single piece of strip material, in which guides or guide surfaces **36'** and **38'** are in the form of wings made integral with the bearing section, and wing **38'** is provided with an extension **39** which serves as a guide for radially turning a barrel to properly orient the barrel and its lugs for lifting. The extension may be at the end of either wing depending, of course, on the orientation of the bearing when mounted.

The bearing sections of sleeve bearings **30** and **31** receive shafts **40** and **42** (FIG. 2), respectively, which rotate therein. Shaft **40** is provided with circular head **44** rotatably mounted in the channel of support member **10**. Shaft **42** is provided with pinion **46** for a purpose which will be described later. Each of the shafts **40** and **42** are provided with a slot extending from its periphery inwardly as shown at **48** for shaft **42** in FIG. 8. The slots are designed to receive lifting lugs **27** and **28**.

Pinion **46** meshes with vertically movable rack **50**. Rack **50** is mounted between the base of sleeve bearing **31** and the interior surface of channel **12**. A rod **52** is attached at one end to rack **50** as shown in FIG. 7 and at the other end to lever **56** as shown in FIG. 5. The rod **52** extends through cross bar **18**. Lever **56** is attached by means of a hinge **58** to anchor bar **60** which is attached to cross bar **18**. A spring member **62** surrounds the end of rod **52** between the top of cross bar **18** and the bottom of lever **56**. It will be seen by this construction that vertical movement of lever **56** serves to move rack **50** vertically by means of rod **52**, this movement in turn rotating pinion **46** and, accordingly, barrel **26** through lugs **27** and **28** resting in slots in shafts **40** and **42**, respectively, in corresponding sleeve bearings **30** and **31**.

As shown in FIG. 1, a linking rod **64** is connected at its upper end to the end of lever **56** with its bottom end passing through a hole in bracket **66** mounted on fork lift truck **22**. A chain or other type connecting means may be used instead of rod **64**. The lower end of linking rod **64** is threaded and carries two inwardly threaded adjustable collars **68** and **70**, one above and one below the bracket member.

Reference is now made to FIGS. 10 and 11 showing a modification in which the channels of the support members are turned outwardly. In this modification the rack **50'** and pinion **46'** are seated inside the channel while the sleeve bearing **31'** is, of course, mounted on the inner surface of the support member **12'**. A roller **51** is mounted on the support member by means of spindle **53** and is in contact with rack **50'** to align it and permit its smooth movement. As shown in FIG. 11, the pinion **46'** is mounted by means of pinion shaft **57**, flange bearing **59** and retaining nut **61**.

Reference is now made to FIGS. 12 and 13 for a description of the modification in which the lifting frame is horizontally oriented. In this modification the rack **50''** and pinion **46''** are mounted transversely of support members **80** and **82** which are preferably turned outwardly at their ends to serve as guides for barrel entry and to provide a pivot point **89** located so that lever **56''** will be vertically aligned above rack **50''**.

A preferred, although not required, structure for mounting the rack and pinion is shown in FIG. 13 in which two plates **84** and **86** attached to support member **82** by a bolt or other means support the pinion **46''** between them in contact with rack **50''**. The sleeve bearing **31''** enclosing shaft **42''** connected to pinion **46''** is supported in position by welding to the inner face of plate **84** or otherwise. Slots **88** and **90** are provided on the bottoms of support members **80** and **82**, respectively, for receiving forks of a fork lift truck. The slots extend laterally beyond the support member **80** and **82** for providing accommodation of forks of varying distances apart. These slots may be located otherwise and other means may be provided for receiving the forks.

The dumping mechanism is preferably mounted above support member **82** and comprises lever **56''** pivotally attached at point **89** on member **82** and attached to rack **50''** so that movement of lever **56''** vertically will correspondingly move rack **50''**. Spring **62''** can be provided between lever **56''** and top plate **90** to insure its return movement.

The operation of the modification of the barrel transporting and dumping device of the invention is shown in FIGS. 1–8 as follows. The fork lift truck is first moved into position with arms **20** and **21** threaded through slots **19** as shown in FIG. 1. The device is then lifted by lifting the fork members and transported to the barrel to be dumped where it is positioned as shown in FIG. 2 with the sleeve bearing **30** and **31** below the lifting lugs **27** and **28** in such a position that when the forks **20** and **21** are raised carrying the device upwardly with them, the lifting lugs **27** and **28** will be fitted into slots in shafts **40** and **42**. The barrel can now be transported and will be held in upright position by means of pinion **46** and rack **50**, as rack **50** is held in a stationary position.

Prior to or at the time of dumping, connecting rod **60** is threaded into bracket **66** as shown in FIG. 4, for example, and the apparatus is in condition for dumping the barrel.

In accordance with the construction described, the barrel is dumped as shown in FIG. 6 by forks **20** and **21** which in turn lift linking rod **64** until collar **70** abuts the bottom of bracket **66**. Further movement of the forks results in rack **50** being forced in a downward direction which in turn rotates pinion **46** in a counterclockwise direction to dump barrel **26**. When barrel **26** has been tilted from an upright position, shafts **40** and **42** will be rotated so that the slots therein will be closed by the internal surfaces of sleeve bearings **30** and **31**, respectively, so that the lifting lugs cannot fall out of the slots. After the barrel has been dumped, it is returned to upright position by lowering the fork lift and by means of spring **62** which automatically forces lever **56** up to the original position to return the barrel to upright position as shown in FIG. 6. The empty drum is then returned to its original location and the lifting frame lowered to disengage the sleeve bearings **30** and **31** from shafts **27** and **28**, respectively, and the fork lift truck backed away to remove the lifting frame from the barrel for the next operation.

The construction of the lever **56**, hinge **58**, anchor bar **60**, spring **62** and connecting rod **64** with its threaded collars **68** and **70**, all operating in conjunction with the arms of the fork lift truck for rotating the barrel, is a preferred means for rotating the barrel. Other equivalent

means can obviously be used and this structure is merely an illustration of an operable structure for the purpose. The operation of the modification shown in FIGS. 12 and 13 is, of course, analogous to that described above.

It is readily seen from the above description that a barrel transporting and dumping apparatus has been provided which is simple in construction and operation, is safe for dumping heavily loaded containers, and which can be effectively used by one operator with a fork lift truck.

While the invention has been illustrated by its application with two support members and two sleeve bearings, it is not limited to this structure as a single sleeve bearing and/or a single support member may be used. For example, the sleeve bearings can be substantially lengthened so that one of them will support a heavy barrel and used on a single support member.

It is to be understood from the foregoing that various changes and modifications may be made in the particular construction and arrangement of parts in the preferred and alternate forms of invention without departing from the scope thereof as defined by the appended claims.

What is claimed is:

1. Apparatus for transporting and dumping containers comprising: a lifting frame including two spaced apart support members stationary with respect to each other; a sleeve bearing mounted adjacent each of said support members having an opening at its top; a rotatable split shaft in each of said sleeve bearings; and interengaging means supported adjacent at least one of said support members for engaging the end of a shaft for rotating it in its corresponding sleeve bearing.

2. The apparatus of claim **1** in which said shafts are each provided with a slot for receiving lugs on the container.

3. The apparatus of claim **1** in which each of said sleeve bearings is constructed with guide means forming a guide into its bearing area.

4. The apparatus of claim **3** in which said guide means are surfaces sloping outwardly from the entrance to said bearing area and in which a guide extension is attached to the end of one of said surfaces of each of said sleeve bearings for radially orienting a barrel so that it can be lifted by said apparatus.

5. Apparatus for transporting and dumping containers comprising: a lifting frame including two spaced apart support members; at least one rack mounted adjacent at least one of said support members; an open sleeve bearing having guide means for guiding support elements into its bearing section mounted adjacent each of said support members; a rotatable slotted shaft in each of said sleeve bearings; and a pinion at the end of at least one of said shafts meshing in said rack.

6. Apparatus of claim **5** in which said guide means comprises surfaces sloping upwardly and outwardly from the entrance to the bearing area of said bearing.

7. Apparatus of claim **6** in which a guide extension is provided at the end of one of said surfaces for each guide means to axially orient said support elements for entry into the slots of said shafts.

8. Apparatus for use with a fork lift truck to transport and dump containers comprising: a lifting frame including two spaced apart support members connected at one end by a cross bar; means associated with said lifting frame for receiving the arms of a fork lift truck; a rack mounted adjacent at least one of said support members; an open sleeve bearing having guide means for guiding barrel lugs into its bearing section mounted adjacent each of said support members; a rotatable slotted shaft in each of said sleeve bearings; and a pinion at the end of at least one of said shafts meshing in said rack.

9. The apparatus of claim **8** including means actuated by movement of the arms of said fork lift for effecting movement of said rack and pinion.

10. The apparatus of claim **8** in which the guide means comprise surfaces sloping outwardly from the entrance

to the bearing area of said open sleeve bearing and one of said surfaces of each of said bearings is provided with a guide extension at its end as a guide means to axially orient said barrel lugs for entry into said slots.

11. Apparatus for use with a fork lift truck for dumping containers comprising: a lifting frame including two spaced apart vertical support members connected at their top ends by a cross bar provided with means for receiving the arms of a fork lift; a rack mounted on the internal surface of at least one of said support members; an open sleeve bearing having outwardly extending surfaces forming a guide into its bearing section mounted on the inner surface of each of said support members; a rotatable slotted shaft in each of said sleeve bearings; a pinion carried by one of said shafts meshing in said racks; a lever hingedly attached to said cross bar; connecting means between said rack and said lever; and means for adjustably anchoring one end of said lever to said fork lift truck; whereby vertical movement of said lever by movement of said forks effects movement of said rack and pinion.

12. Apparatus of claim **11** in which said lever is biased into its upward position.

13. In a transporting and dumping apparatus including a lifting frame, a supporting and dumping mechanism comprising at least one open sleeve bearing having a bearing section and an entrance to the bearing section; outwardly and upwardly extending guide members on each side of said entrance; a guide extension on the end of one of said guide members angled in the direction of the other guide member to provide a contact surface for a container lug; and a rotatable shaft having a slot therein in the bearing section of said sleeve bearing.

14. The mechanism of claim **13** including a pinion on one end of said shaft and a rack mounted on said lifting frame and meshing with said pinion.

15. Apparatus for dumping containers comprising: a lifting frame including two horizontally disposed support members connected at one end by a cross bar; means associated with said support members for connecting lifting means thereto; an open sleeve bearing mounted on the top of each of said support members; a slotted shaft in each of said sleeve bearings; a rack supported adjacent the end of one of said sleeve bearings; a pinion on the end of one of said shafts meshing with said rack; a lever connected to said rack and pivotally mounted at one end on one of said support members; and means for anchoring the free end of said lever.

16. The apparatus of claim **15** in which said rack is supported between two support plates attached to the outside of one of said support members.

17. Apparatus for attachment to support means for supporting and rotating an article comprising a sleeve bearing having an entrance and a bearing section; a slotted shaft in said bearing section having a pinion on one end; guide means for guiding support means on said article into said slotted shaft and a rack meshing with said pinion; whereby upon movement of said rack the shaft is rotated to rotate said article and said support means are locked in said sleeve bearing.

18. Apparatus for dumping containers comprising: frame structure including two spaced apart support members; means associated with said support members for connecting lifting means thereto; a rack mounted adjacent at least one of said support members; an open sleeve bearing mounted adjacent each of said support members; a rotatable slotted shaft in each of said sleeve bearings; and a pinion at the end of at least one of said shafts meshing in said rack.

19. Apparatus for dumping containers comprising: a lifting frame including two horizontally disposed support members connected at one end by a cross bar; means associated with said support members for connecting lifting means thereto; an open sleeve bearing mounted adjacent each of said support members; a slotted shaft in

each of said sleeve bearings; a rack supported adjacent the end of one of said sleeve bearings; a pinion on the end of one of said shafts meshing with said rack; and means for moving said rack to rotate said shaft whereby a container supported by said shaft is rotated to be emptied.

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