April 21, 1953 C. F. ERNST 2,635,775

GRASP DEVICE FOR HAND TRUCKS

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Fig. 2

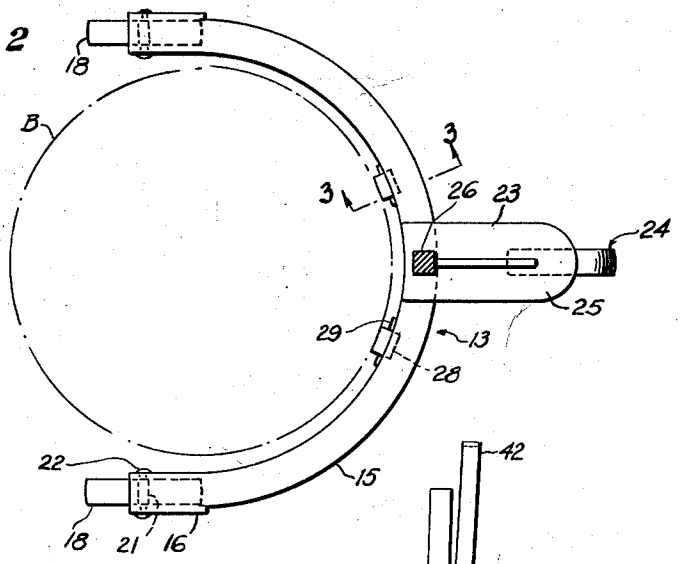


Fig. 1

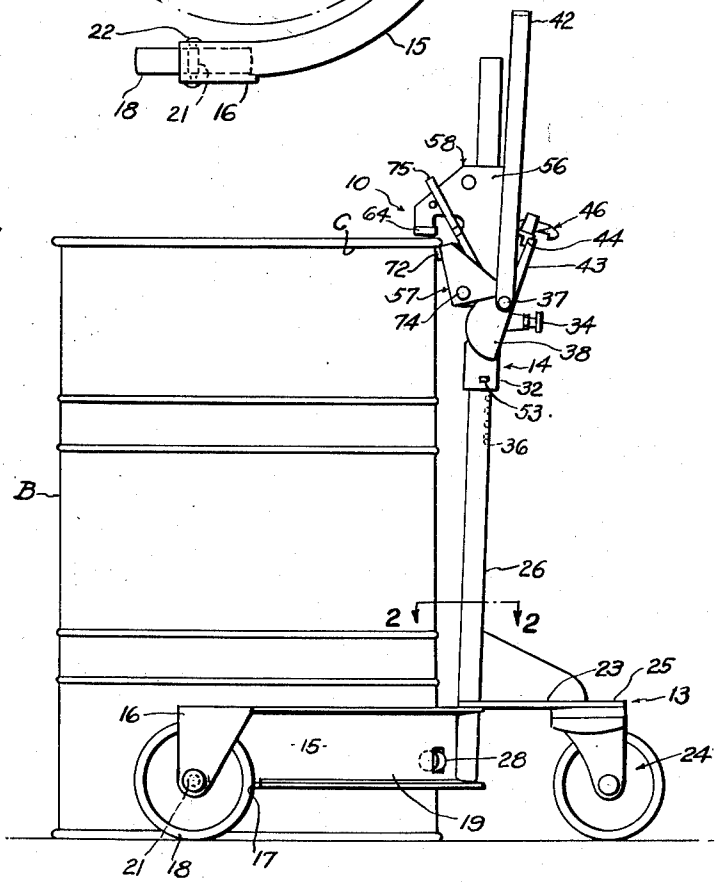
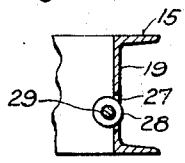


Fig. 3



INVENTOR.
Charles F. Ernst

BY

Joseph D. Lear
ATTY.

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Fig. 6

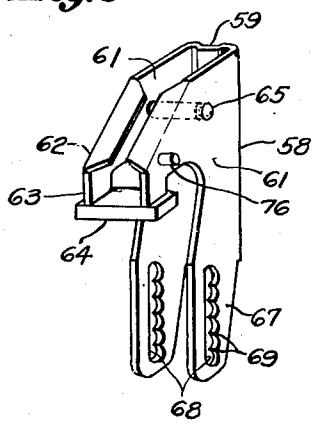


Fig. 5

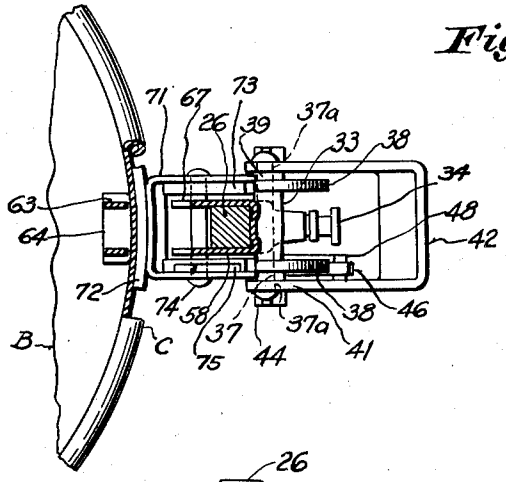
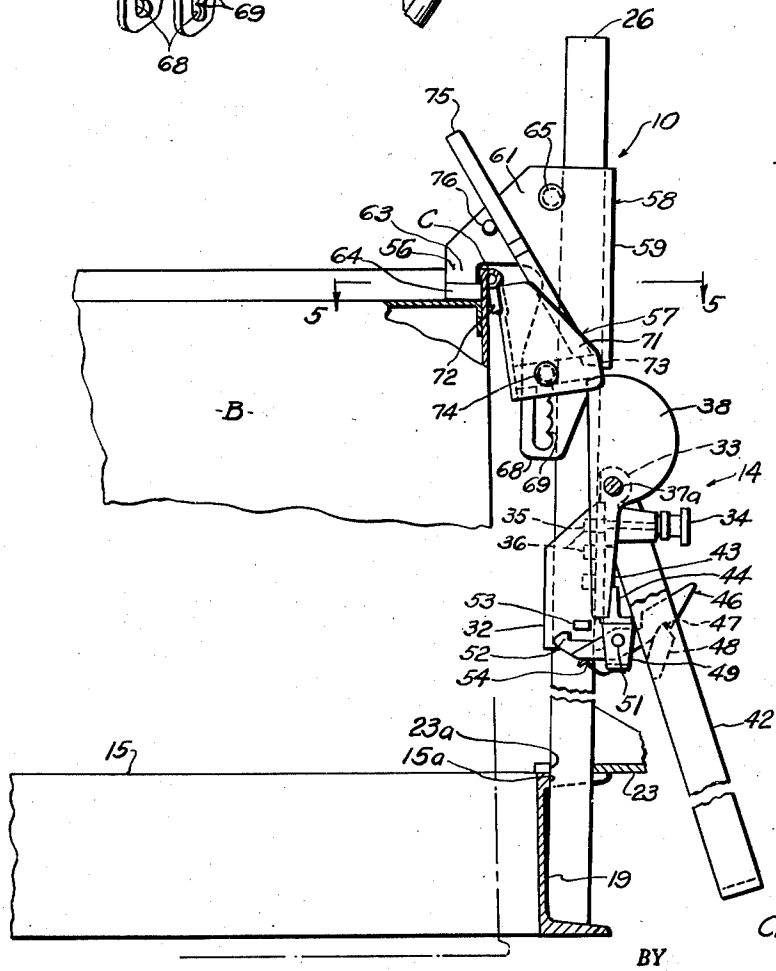


Fig. 4



INVENTOR.
Charles F. Ernst

BY

Joseph D. Lear
ATTY.

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GRASP DEVICE FOR HAND TRUCKS

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Fig. 11

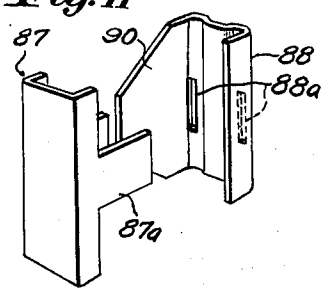


Fig. 8

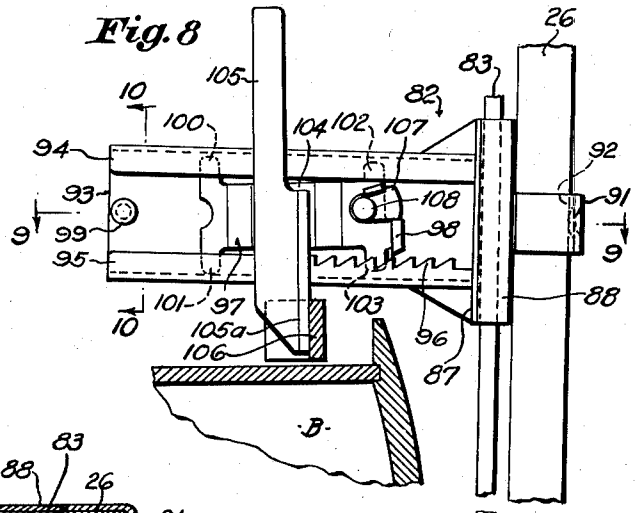
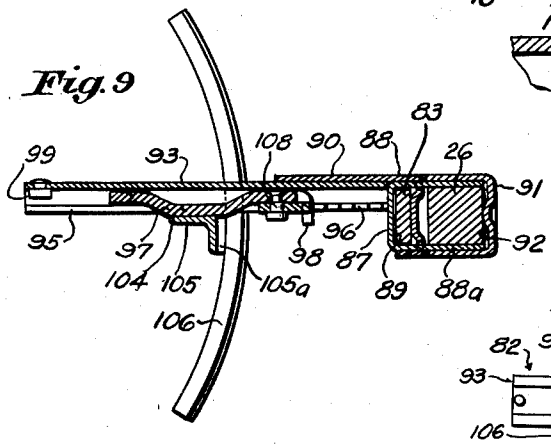


Fig. 9



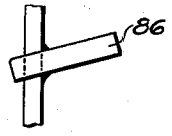
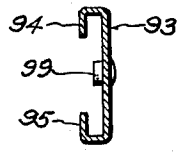


Fig. 7

Fig. 10



INVENTOR
Charles F. Ernst

BY Joseph D. Lear
ATTY.

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2,635,775

GRASP DEVICE FOR HAND TRUCKS

Charles F. Ernst, Buffalo, N. Y.

Application March 9, 1949, Serial No. 80,440

5 Claims. (Cl. 214—654)

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This invention relates to improvements in raising and transporting devices or trucks for rigid containers such as barrels and drums.

In prior devices of this type, manually operable means have been provided for gripping the chime of a metallic barrel preparatory to raising the barrel by means of an elevating mechanism directly associated with the gripping device. The barrel, having been properly elevated from the floor, was thus in a position permitting transport, with the gripping device being the chief support therefor. In this connection considerable trouble has been experienced in retaining the grip on the barrels during transport over rough and uneven factory or warehouse floors, and dangerous failures have occurred either due to wear on the gripping means or to failure of the operator to lock properly the gripping mechanism.

The present invention contemplates the provision of a novel gripping mechanism which is energized automatically by the raising of the barrel so that the weight of the barrel constantly governs the degree of gripping action. This has been found not only to obviate the danger of release during rough transport conditions, but to eliminate the time and danger incurred in the manual actuation and release of the gripping means as heretofore practiced.

The invention is also concerned with improvements in the elevating portion of the mechanism so that heavy loads may be raised with a minimum frictional loss, and, when so raised that accidental reversing of the process is rendered impossible.

Other features and objects of the invention reside in several adjustable means for adapting the device to barrels of different types and also to various structural improvements which permit economical mass production, as more fully set forth in the following description and claims.

In the accompanying drawings:

Fig. 1 is a side elevation of a lift truck embodying one form of the invention, in position preparatory to engaging the chime of a metal barrel or drum;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged section on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged side elevation showing the barrel engaged in elevated position, with the chassis shown in vertical section to portray the structure thereof;

Fig. 5 is a section on the line 5—5 of Fig. 4;

Fig. 6 is a perspective view of the slide body of the gripping unit;

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Fig. 7 is a side elevation similar to Fig. 1 wherein is shown another embodiment of the invention, adapted to engage wood barrels;

Fig. 8 is an enlarged side elevation of the upper chime engaging unit of Fig. 7;

Fig. 9 is a section on the line 9—9 of Fig. 8;

Fig. 10 is a section on the line 10—10 of Fig. 8;

Fig. 11 is a perspective view showing the guide forming members of the upper unit in disassembled relation.

In Figs. 1 to 6 inclusive, the gripping mechanism 10 of the device is for use with a metallic barrel or container B of such structure or strength that the barrel may be raised by engagement with the upper chime portion C. The same truck unit 13 including an accompanying lift unit 14 is adapted for use with both embodiments of the invention herein illustrated.

The truck unit 13 includes a chassis fabricated of a semi-circular member 15 within which a barrel B may be partly received (Fig. 2). This member is formed from a structural channel (Fig. 4), and at its extremities depending brackets 16 are welded to the upper flange thereof. The underlying portions of the lower flange are cut away, as indicated by the numeral 17, so that a wheel 18 may be received between the web 19 of the channel 15 and each bracket 16. The wheels 18 are rotatably mounted on axles 21 which in turn extend through aligned apertures in the web 19 and brackets 16 and are riveted in position as indicated by the numeral 22.

A bracket 23 is welded to the central portion of the channel 15 and a swivel caster 24 is secured to its free extremity 25. The adjoining portions of the bracket 23 and channel 15 contain slots 23a and 15a respectively (Fig. 4), for receiving a square post 26 whose lower extremity rests on the lower flange of the channel. The post 26 is rigidly welded to the bracket and channel and it extends upward at preferably a slight angle to the vertical.

The channel 15 is also formed with openings 27 (Fig. 3) in its web 19, and such openings are spaced equally from the post 26 and receive small rollers 28. The rollers 28 are rotatably mounted on pins 29 welded to the interior face of the web 19. The projecting portions of the rollers 28 serve as guides and steady rests for the barrel B, during elevation or transportation, as will hereinafter be more fully explained.

The lift or elevating unit 14 is carried by the post 26 and it is adjustable thereon to various vertical fixed positions so that barrels of different heights may be readily accommodated. The unit

14 includes a tubular sleeve 32 mounted for sliding movement along the post 26. A bearing member 33 forms part of the sleeve 32, and it carries a spring pressed plunger 34, the terminal portion 35 of which may be selectively entered in one of the spaced sockets 36 in the post 26 (Figs. 4 and 5). A pivot pin 37 extends horizontally through and is fastened to the bearing portion 33, and its projecting terminals 37a serve to receive rotatably a pair of cam or eccentric members 38, spacing washers 39, and the extremities 41 of a U-shaped handle 42. The cam members 38 have projecting integral arms 43 which are connected at their extremities by a welded tie bar 44 so that the cams may be rotated as a cam unit on the pivot pin 37.

It will be observed that upon clockwise manual rotation of the handle 42 from its upper position (Fig. 1), it contacts the bar 44 of the cam unit and carries it to its lower position as shown in Fig. 4. This movement, in conjunction with the gripping mechanism 10, constitutes the barrel-lifting stroke of the device. During the first few degrees of the opposite or counterclockwise movement of the handle 42, the cam unit will not follow the handle, since it is in a locked or dead center position with respect to the load, as will be presently understood. The handle 42 and bar 44 are therefore coupled by a latch unit 46 having a latch element 47 engaging a dog 48 secured to an adjacent portion of the handle 42 (Fig. 4). A bracket 49 is secured to the bar 44, and it is provided with a pin 51 upon which the unit 46 is pivotally mounted. The latch unit 46 is also formed with a second or lock latch portion 52, which is engageable with a projecting dog 53 forming part of the sleeve 32. A leaf spring 54, carried by the bracket 49, engages the portion 52 and constantly urges the latch device 46 in a clockwise direction.

The engaging or gripping mechanism 10 includes internal and external chime engaging units 56 and 57, the former consisting of a slide body 58 (Fig. 6) of heavy sheet metal formed with a back 59 and sides 61 which enclose three sides of the post 26 (Figs. 5 and 6). The sides 61 have reinforced projections 62 terminating in depending ears 63, to which is welded a transverse bar or internal chime engaging jaw 64. A spacer rivet 65 connects the sides 61 and it is positioned to engage the outer side of the post 26. The lower portions of the sides 61 are formed with wings 67 containing aligned vertical slots 68, the right hand wall of such slots having regularly spaced teeth or projections 69.

The external chime engaging unit 57 (Figs. 4 and 5) is fabricated of a channel shaped body 71, a curved external jaw member 72 welded to the upper margin of the body 71, and a pair of cam follower blocks 73 welded to the internal sides of the body 71, each in spaced relation to the lower margin thereof. The unit 57 straddles the wings 67 of the unit 56, as best seen in Fig. 5, and the units are loosely connected by a pivot pin 74, which pin is carried by the unit 57 and extends horizontally through the slots 68 of the wing portions 67. The unit 57 also carries an upwardly projecting arm 75 which is engageable by a projecting stud 76 secured to one of the projections 62 of the slide body 58. When thus assembled and mounted on the post 26, it will be seen that the cam follower blocks 73 of the gripping mechanism 10 rest directly on the cam members 38 of the elevating unit 14.

In operating the device, the handle 42 is swung to its uppermost position and the truck is maneuvered to encompass the barrel B (Fig. 1) with the external jaw member 72 of the gripping mechanism 10 brought into registry under the chime C of the barrel. The internal chime engaging unit 57 is then slid downwardly on the post 26 until its jaw 64 engages the interior portion of the chime C. In Fig. 1, the jaw 64 of unit 57 is shown about to enter within the chime, while in Fig. 4 the engaged position is shown. After this preliminary operation, the handle 42 is turned clockwise to actuate the cams 38, and thus raise the gripping mechanism 10 and barrel B. The lower portion of the barrel, during this operation, rides on the rollers 28, which serve to prevent axial displacement of the barrel.

Referring now to the mechanics of the gripping action, it will be seen in Fig. 4 that the load or weight of the barrel, resting on the outer jaw 72, may be resolved into two force components, one force resulting in a load applied angularly downward through the cam follower blocks 73 to the cams 38, while the other force, which is horizontal, is applied to the internal jaw 72 of the unit 57. This results in the chime being gripped firmly between the jaws. During the raising of the barrel, the pin 74, being retained in the slots 68, prevents horizontal displacement of the external element 57. The projections 69 in the slots 68 which engage the pin 74 prevent separation of the units 56 and 57 during the lowering of the barrel, when the frictional load of the slide body 58 on the post 26 would otherwise tend to influence such separation.

When the barrel is in raised position, as shown in Fig. 4, the handle 42 may be freed of its connection with the cam unit, so that it may be used for towing the truck. This is accomplished by lifting the latch device 46 and raising the handle 42 to clear the dog 48, whereupon the second latch portion 52 immediately engages the dog 53 on the sleeve 32. In subsequent towing movement of the truck, the cam unit is thus effectively locked to the post against displacement which might be caused by accidental blows or severe jogging over rough floors.

When it is desired to lower the barrel, the handle 42 is simply dropped to its lowest position, whereupon the dog 48 engages the latch portion 47 and causes the disengagement of the latch portion 52 from the sleeve dog 53. With the handle 42 and cam unit thus reunited, the handle is again operable to lower the barrel. The arm 75 of the unit 57 is provided to enable the operator to disengage the jaw 72 from beneath the chime C after the barrel is lowered to the floor.

It will be noted that when the barrel is in the raised position of Fig. 4, the cams 38 are slightly beyond their dead center position with relation to the load on the cam follower blocks 72. This not only serves as an additional lock, but permits operation of the latching device without danger to the operator. Over-travel of the cams is prevented by engagement of the bar 44 against the post 26, so that the bar also acts as a stop member.

The invention is applicable to barrels and containers having various styles and sizes of chimes, since the jaws of the chime engaging units 56 and 57 may be separated vertically and horizontally to accommodate chimes of larger sizes. In such cases the pin 74 may engage different teeth 69 in the slotted portion of the slide body 58.

In Figs. 7 to 11 inclusive, a gripping mechanism is similarly organized to be actuated by the lift unit 14, and it consists of chime engaging units 81 and 82. The unit 81 includes a lift bar 83 carried for sliding movement on the post 26 by an attached clevis 84, and guide means incorporated in the unit 82. The lower portion of the bar 83 is provided with a tapered wedge 85 which is adapted to be rammed under the lower chime or bottom of a barrel B' and to carry the load of the barrel when it is raised. A pair of spaced cam followers 86 are secured to the central portion of the bar 83, and they straddle the post 26 and ride upon the cams 38 of the lift unit 14.

The unit 82 is fabricated of a number of heavy sheet metal members to provide a carrier for a chime engaging member hereinafter described. A receiving portion for the bar 83 is provided by two channel shaped members 87 and 88 (Fig. 11), assembled in nested relation (Fig. 9) to form a rectilinear tube-like portion 89. The member 87 is provided with central arms 87*a* which project through aligned slots 88*a* in the member 88 and which straddle the post 26. A U-shaped cap member 91 is welded to the arms 87*a*, and together therewith form a second receiving portion 92, this portion being devised to receive the post 26. A guide member 93, of channel formation, is provided with reentrant opposed marginal flanges 94 and 95, the lower flange 95 being formed with spaced ratchet teeth 96. The previously described member 88 is provided with a flange extension 90 to which the member 93 is welded.

A ratchet member 97 is received within the guide member 93 and it is formed with a projecting dog 98 on its right hand extremity, which engages in one of the teeth 96. The left hand corners of the member 97 are provided with extending rounded ears 100, 101, which are supported both laterally and vertically within the guide member 93 for sliding movement. At the right hand corners, the member 97 is formed with similar ears 102, 103, which ears, however, are shorter, so that although they are laterally supported in the member 93, they permit an up and down movement of this end of the guide member 97 to permit disengagement (Fig. 8) or engagement (Fig. 7) of the dog 98 with one of the teeth 96.

The central portion of the member 97 is bent laterally to project beyond the plane of the flanges 94 and 95 and to provide a seat 104, upon which is welded an arm 105. The arm 105 is provided with a depending flanged portion 105*a*, to which a curved jaw 106 is secured (Fig. 9). The ratchet unit is retained against accidental loss from the guide member by a rivet 99 secured to the extremity of the guide member.

A lock pawl 107 is pivotally mounted on a stud 108 riveted to the right hand portion of the ratchet member 97, and such pawl is movable from an inoperative or horizontal position (Fig. 8) to a vertical position (Fig. 7) to frictionally engage the overlying portion of the guide flange 94, thus effectively locking the latch unit against movement.

It will be observed that after the wedge 85 of bar 83 is positioned under the barrel, the unit 82 may be slid downward on the post 26 until the jaw 106 engages the head of the barrel B'. The ratchet member 97 is then moved to position the jaw 106 with the interior of the barrel chime. During this adjustment, the ratchet dog 98 enters one of the guide teeth 96 and the barrel is ready for elevation. The handle 42 is then swung downwardly, to cause the cams 38 to engage the followers 86, thereby elevating the barrel in the manner described in connection with the first embodiment.

It will be noted that both forms of the invention include, as common subject matter, a truck unit which partially surrounds the container, an elevating mechanism having a part to engage a chime, and a projecting member adapted to engage the inner edge of a chime to prevent the container from tipping over. The differences in the two forms reside in the adaptation of the truck to metal barrels, which are commonly formed with rolled chimes, and wooden barrels in which the ends of the staves are smooth. It is also to be noted that the transport device may be fabricated from sheet metal, thereby making it inexpensive to manufacture, and withal providing an apparatus having high strength.

It will be understood by those skilled in the art that the examples of the invention as above described are intended to disclose certain inventive principles, which are obviously applicable to numerous other styles of barrels and containers. It is therefore intended that the invention shall be deemed commensurate with the scope of the following claims.

I claim:

1. In apparatus for transporting containers including a truck having a vertical post, an elevating device affixed to said post including cam means and a handle, means on the device for mounting the cam means and the handle for independent rotation, latch means carried by the cam means and adapted to engage said handle to connect the cam means and handle for united rotation, container engaging means carried for guided movement by said post and including a follower resting on said cam means, said cam means being operable by said handle to elevate said container engaging means to a raised position on said post, and a dog on said elevating device, said latch means being manually disengageable from the handle when the cam means have been moved to raise said container engaging means and being then engageable with said dog to lock the cam means against rotation and to free said handle for towing movement of the truck.

2. In apparatus for transporting chimed containers including a truck having a vertical post, container engaging means including a member slidably mounted on said post and having a jaw portion spaced from said post and being formed to engage the interior of a container chime, said member being also formed with a vertically slotted portion below said jaw portion and adjacent said post, a second member, a pivot pin carried by said second member and engaging through the slotted portion of said first member, said second member having a vertically extending portion terminating in a jaw, said second member being swingable to an angular position to permit engagement of the jaw thereof with the exterior of a container chime, and a lifting device affixed to the post and having a vertically movable portion supporting said second member.

3. In apparatus for transporting chimed containers including a truck having a vertical post, a lifting device affixed to said post and having spaced lift cam means, means for operating said cams, container supporting means comprising a channel shaped member having one wall and projecting sides slidably engaging said post, a jaw

carried on the terminal portion of the sides and spaced from said post, a second channel shaped member having sides extending toward said post, a jaw carried by said second member adjacent the upper extremity thereof and interposed between the jaw of said first member and said post, said jaws being adapted to engage opposite sides of a container chime, a pivot pin carried by the second member and extending between the sides adjacent the lower extremity thereof, said first member being formed with slotted portions in the sides thereof adjacent said post for slidably receiving said pin, and cam follower plates carried by each side of said second member adjacent the lower extremity thereof, said plates being supported on the lift cam means of said lifting device.

4. In apparatus for transporting containers including a truck having a vertical post, a bar, means supporting said bar for sliding parallel movement relative to said post, a lateral projection on the lower extremity of said bar adapted to be engaged under a container, a unit including a body formed with spaced parallel guide portions slidably engaged about said post and said bar, a channel shaped portion projecting horizontally from said body and having reentrant flange portions, a ratchet member received in said channel shaped portion and having a projecting dog, teeth formed in one of said flange portions, said ratchet member being slidably movable in said channel shaped portion whereby

the dog thereof may be selectively engaged with one of said teeth, a curved jaw carried by said ratchet member and adapted to engage the internal margin of the top of a container, follower means carried by said bar, and an elevating mechanism affixed to said post and engageable with the follower means on said bar.

5. In apparatus for transporting containers, a truck including a channel bent into generally semi-circular form to encompass a container adjacent one end thereof, depending brackets connected to the ends of the channel, wheels of small diameter rotatably mounted on the brackets, spaced guide rollers rotatably mounted in the channel adjacent the bight portion thereof, a plate extending rearwardly from the channel substantially midway between its ends, a swivel caster mounted on the plate, an upright post secured to the channel between the guide rollers, an elevating mechanism slidably mounted on the post, said mechanism including a towing handle, and an interior chime gripping member mounted on the post above the gripping mechanism.

CHARLES F. ERNST.

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