

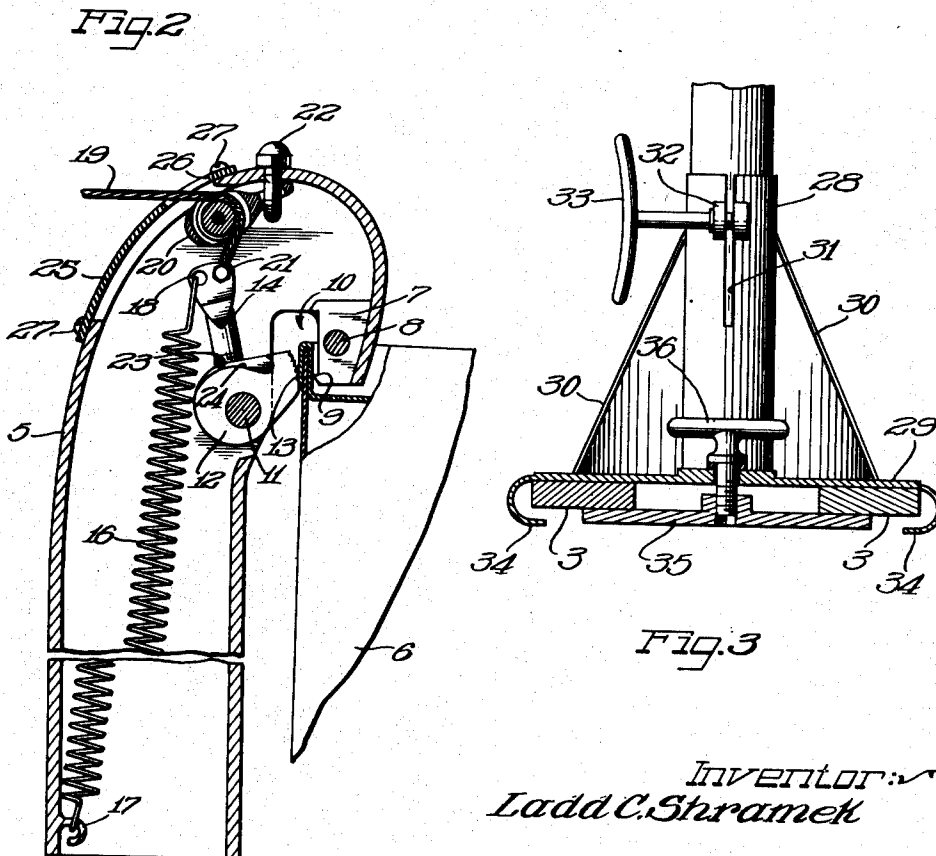
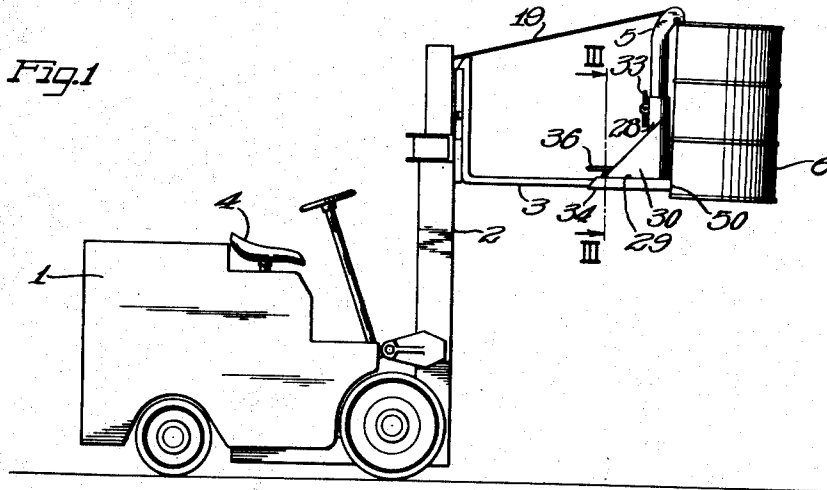
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DRUM LIFTER FOR INDUSTRIAL TRUCKS

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DRUM LIFTER FOR INDUSTRIAL TRUCKS

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This invention relates to a lifting and transporting mechanism and is especially useful in connection with material handling apparatus such as transporting and elevating trucks. More particularly, the invention relates to a lifting and moving device which may be attached to a common elevator truck without modification and which will enable such truck to transport barrels, drums and other similar containers.

While various mechanisms have been designed for the elevation and transportation of barrels and the like, the devices have generally fallen short of the needs of industry in that they are excessively complicated, or are limited to the handling of particular shapes of containers. It is, therefore, a major aim of my invention to provide a device of the type mentioned which is simple and inexpensive in construction and which is also adaptable for use with almost all drums now in use.

A further object of my invention is to provide a container lifting and transporting device which may be attached with a minimum of effort to any of the common commercial elevator trucks now in general use.

A further object of the invention is to provide a container lifting mechanism which may be readily adjusted to handle containers of different types.

Yet another object of my invention is to provide a container lifting and transporting device wherein the weight of the container supplies a major portion of the gripping force, by virtue of which feature any tendency for heavy containers to slip and fall is overcome.

Other objects and advantages will appear to those skilled in the art from an inspection of the following detailed description of the attached drawings.

On the drawing:

Figure 1 is a view in side elevation of an elevating and transporting truck provided with the lifting mechanism of my invention;

Figure 2 is an enlarged broken cross-sectional view of the internal parts of my gripping mechanism; and

Figure 3 is an enlarged cross-sectional view taken as indicated by the line III-III of Figure 1.

As shown on the drawings:

The power-operated elevating and transporting truck 1 is of well known construction and is provided with elevator columns 2 upon which the usual lift forks 3 are mounted for vertical movement. An operator is seated at 4, from which position he operates the truck and elevator by

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means of well known controls not shown herein. At the right end of the lift forks 3 is positioned the lifting device of my invention, shown holding a barrel 6 of a type in general use.

In the embodiment of my invention shown, a hollow-hook-shaped column or housing 5 is provided. At the tip of the hook a backing plate 7 is firmly affixed to the column by means of a throughbolt 8. An upwardly angled holding tooth 9 is formed on the backing plate 7, which provides one wall of a guideway generally indicated at 10. Located at the other side of the guideway is a pivoted eccentrically shaped pawl or cam 12 which is rotatably mounted upon a stationary stud 11. As shown in Figure 2, the pawl 12 is provided with teeth 13 which are sloped upwardly and which are arranged on an arc of increasing radius about the stud 11 in a counterclockwise direction. The stud 11, which forms the pivotal axis for the pawl 12, is positioned at a point vertically lower than the point of contact between the teeth 13 and the container 15. This relationship, along with the upwardly sloping shape of the series of serrations formed by the teeth 13 and the eccentric mounting of the pawl 12 provides a self-energizing grip action on the load. Thus the heavier the load 6 the greater will be the tendency of the pawl 12 to rotate in the clockwise direction, and due to the increasing radius of the teeth 13, the greater will be the gripping force.

While in the embodiment illustrated, the pawl or cam 12 is provided with upwardly sloping teeth 13, it is apparent that modification may be made without departing from the scope of my invention. For example, the teeth 13 may be replaced by a knurled or otherwise roughened surface which would provide sufficient frictional force against a container rim to cause self-energization of the eccentrically shaped pawl 12. Further, it would be feasible in some installations to remove all surface roughness from the pawl and rely entirely upon surface friction and the eccentric shape of the pawl 12 to force the container against the holding tooth 9 by cam action. Similarly, the tooth 9 could be replaced in some light-load uses with a roughened or smooth surface.

The pawl 12 is provided with a radially disposed operating lever 14. A spring 16 is attached at 17 to the housing 5 and at 18 to the operating lever 14. A control cable 19 passes over a pulley 20 and is attached to the operating lever 14 by any well known fastening means as shown at 21. The pulley 20 is pivotally secured to an eye bolt

22 which is in turn securely fixed to the housing 5. A stop pin 23 is fixed to the housing 5 and co-operates with a channel 24 which is so shaped that the pawl 12 may in no case be rendered un-serviceable by excessive oscillation in either direction about the stud 11.

A cover plate 25 with a hole 26 for the passage of the cable 19 is screwed by means of screws 27 to the housing 5. This cover provides a method of easy access to the internal mechanism and also prevents foreign matter from accumulating in the housing 5.

When the device is not in operation, the pawl 12 will be held in an inoperative position by the spring 16. At this time the stop pin 23 will abut the pocket at the right hand end of channel 24. When it is desired to transport a container, the columnar housing 5 is lowered over the edge thereof so that edge of the container enters the guideway 10. The operator then pulls the cable 19. This action rotates the pawl 12 through the control lever 14 in a clockwise direction, engaging the teeth 13 with the rim or flange of the container and compressing such flange against the tooth 9. The container may then be lifted and moved about. As will be seen from Figure 1, the base of the container will rest against the end of the elevator fork 3 to provide lateral support, as at 50.

In order to release the container from the gripping mechanism, the operator merely lowers the container to the ground. When the container touches the ground, continued downward movement of the forks 3 will cause upward movement of the rim of the container relative to the pawl 12 thus removing the load therefrom. As soon as the load has been removed, the spring 16 will automatically return the pawl 12 to its normal inoperative position.

The columnar housing 5 is telescopically mounted in a sleeve 28 which is in turn fixedly secured to a base plate 29, preferably by welding. Supports 30 are rigidly secured between the sleeve 28 and the base plate 29 to provide greater rigidity to the structure. The sleeve 28 is slotted at 31 and is provided with a friction clamp 32 which may be tightened in the conventional manner by means of handle 33. In use, the effective height of the columnar housing 5 may be adjusted by sliding it vertically in the sleeve 28 until the proper height is reached and then securely clamping it in adjusted position by means of the clamp 32.

A further important feature of my lifting mechanism is the arrangement provided for the attachment of the device to the lift fork of the elevator truck. The base plate 29 is provided with downwardly and inwardly turned side flanges 34 to provide support portions upon which the lifting device may be rested when not in use. When it is desired to attach the lifting mechanism to the elevator truck, the elevator is lowered to its lowermost position and the forks 3 are moved forward under the base plate 29. The under plate 35 is then drawn up by means of handle 36 to securely clamp the lifting mechanism to the forks 3. Provision of support 34 allows the attachment of the lifting mechanism to the forks 3 without the necessity of first hoisting the lifting mechanism into position. Since the lifting mechanism is of quite heavy material in order to withstand the loads imposed by very heavy containers, the elimination of any need for manually handling the device itself is a great advantage.

As will be seen from the foregoing description, there is provided a durable and extremely useful lifting mechanism. While the mechanism is simple it will nevertheless handle large loads in any type of open or closed container having an upstanding peripheral rim or flange. The mechanism of my invention is readily adapted to various sizes of containers by adjustment of the clamp 32 to vary the height of the column 5 and by the automatic adjustment of the pawl 12 to container rims of various thicknesses. A minimum of room at the top edge of the container is necessary to obtain adequate gripping. This allows the lifting mechanism to be used with unopened drums and closed containers provided with flanges projecting upwardly from the cover of the container.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concept of the present invention.

I claim as my invention:

1. A lifting mechanism for use with transporting trucks or the like comprising a hook-shaped housing having therein a guideway slot, a holding member on one side of said guideway slot, a gripping pawl on the other side of said guideway slot, means normally biasing said pawl away from said slot, and an operating mechanism for engaging said gripping pawl with a container to be lifted, said gripping pawl having upturned teeth whereby the container is held between said holding member and said gripping pawl by the weight of the container itself.

2. A lifting mechanism for use with transporting trucks or the like comprising a hook-shaped housing having a substantially vertically disposed guideway slot therein, a holding tooth on one side of said guideway, an oscillatory gripping pawl on the other side of said guideway, means normally biasing said pawl away from said tooth and an operating mechanism for oscillating said gripping pawl into contact with a container placed within said guideway slot whereby the container is held by its own weight between said holding tooth and said gripping pawl as the housing is lifted and is automatically released therefrom by movement of said container upwardly relative to said housing when said housing is lowered to place the container on a support.

3. A lifting mechanism for use with transporting trucks or the like comprising a hook-shaped housing having a substantially vertical guideway slot therein, a holding surface on one side of said guideway slot, an eccentrically mounted oscillatory gripping cam on the other side of said guideway slot, means for moving said housing vertically relative to a container in order to place an upstanding lip of the latter within said slot and mechanism for oscillating the eccentric gripping cam into engagement with said lip, said engagement being aided at least in part by downward forces applied to the gripping cam by the lip due to the weight of the container, whereby the container is held between said holding surface and said gripping cam.

4. In a lifting attachment for use with transporting trucks or the like having elevator forks, a columnar housing having a substantially vertical guideway slot therein, a holding tooth rigidly positioned at one side of said guideway slot, a gripping pawl movably positioned at the other side of said guideway slot, an operating mechanism adapted to engage said gripping pawl with the edge of a container located within said guide-

way slot, a sleeve telescopically supporting said columnar housing for vertical movement relative to said container to position said container in said slot, and an elevator fork-engaging base adapted to be clamped to the elevator fork of said transporting truck.

5. A lifting mechanism for use with transporting trucks or the like comprising a housing having a substantially vertically disposed guideway slot therein, a holding tooth on one side of said guideway slot, an oscillatory gripping pawl on the other side of said guideway slot, means normally biasing said oscillatory gripping pawl in a direction away from said holding tooth, and operating mechanism for oscillating said gripping pawl against the force of said biasing means in the direction of said holding tooth whereby said gripping pawl will contact a container rim located in said guideway slot to hold said rim against said holding tooth and to be held in turn in contact with the rim by the weight of the container.

6. A lifting mechanism comprising a housing having a guideway slot therein, a movable gripping member positioned at one side of said guideway slot, and movable across the slot against the influence of a biasing means and an operating arm for overcoming said biasing means and actuating said gripping member into engagement with a container placed within said guideway slot, said gripping member having a self-energizing movement whereby the container is firmly maintained in said slot by its own weight acting on said gripping member.

7. A lifting mechanism for use with transporting vehicles, comprising a hook-shaped housing, having a substantially vertically disposed downwardly opening guideway slot therein, an upwardly angled holding tooth forming one wall of said guideway slot, an oscillatable, eccentrically

mounted gripping pawl pivoted at the other side of said guideway slot and at a point vertically lower than said holding tooth, biasing means for normally retaining said gripping pawl in an inoperative position, operating means for overcoming said biasing means and engaging the gripping pawl with a container positioned in said guideway slot and adjustable mounting means whereby said hook-shaped housing may be vertically adjusted to accommodate containers of different heights.

8. A lifting mechanism for use with transporting and elevating trucks, comprising a columnar housing having a substantially vertically disposed guideway slot therein, a holding member forming one wall of said guideway slot, an oscillatable eccentrically mounted gripping member pivoted at the other side of said guideway slot and at a point vertically lower than said holding member, means for normally retaining said gripping member in an inoperative position, operating means for overcoming said retaining means, a support for said columnar housing, said support including downwardly turned flanges providing spacing means between a floor and said support whereby the lifting mechanism may be attached to said truck without lifting.

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