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DRUM HANDLING ATTACHMENT FOR FORK LIFT

Filed Dec. 31, 1954

3 Sheets-Sheet 1

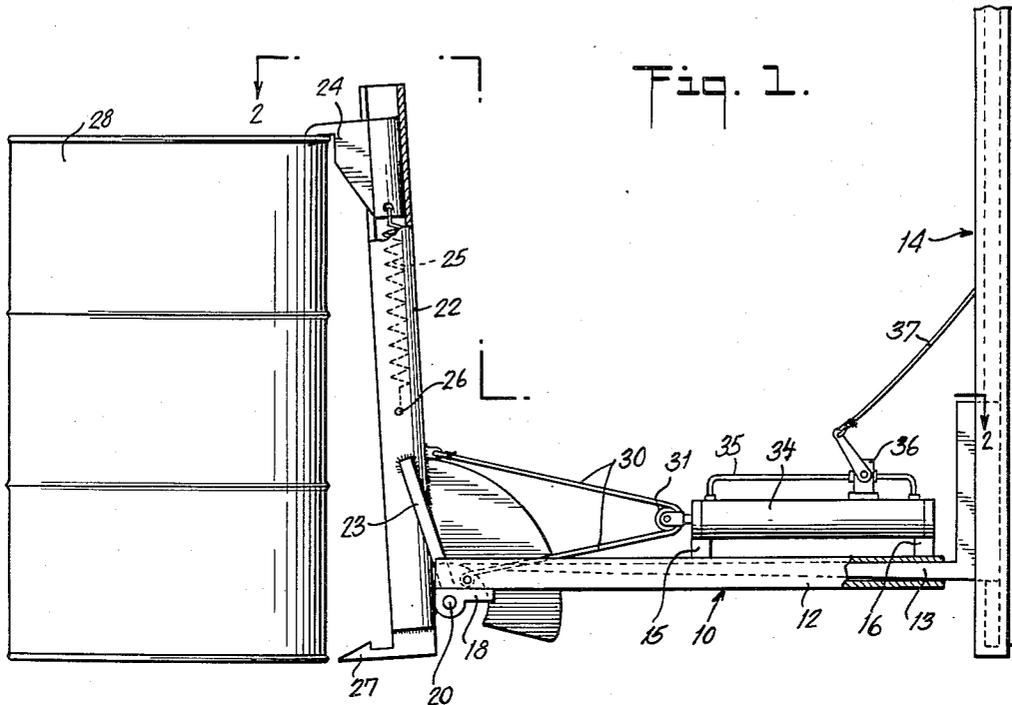


Fig. 1.

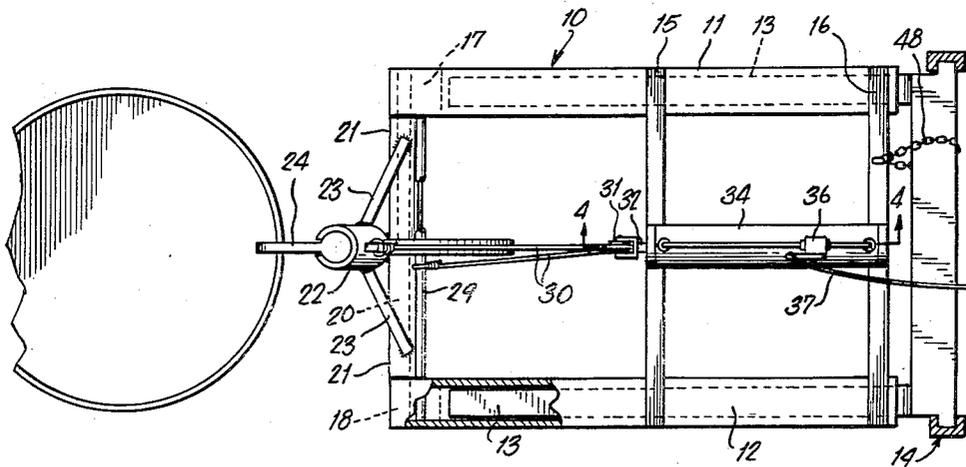


Fig. 2.

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Fig. 3.

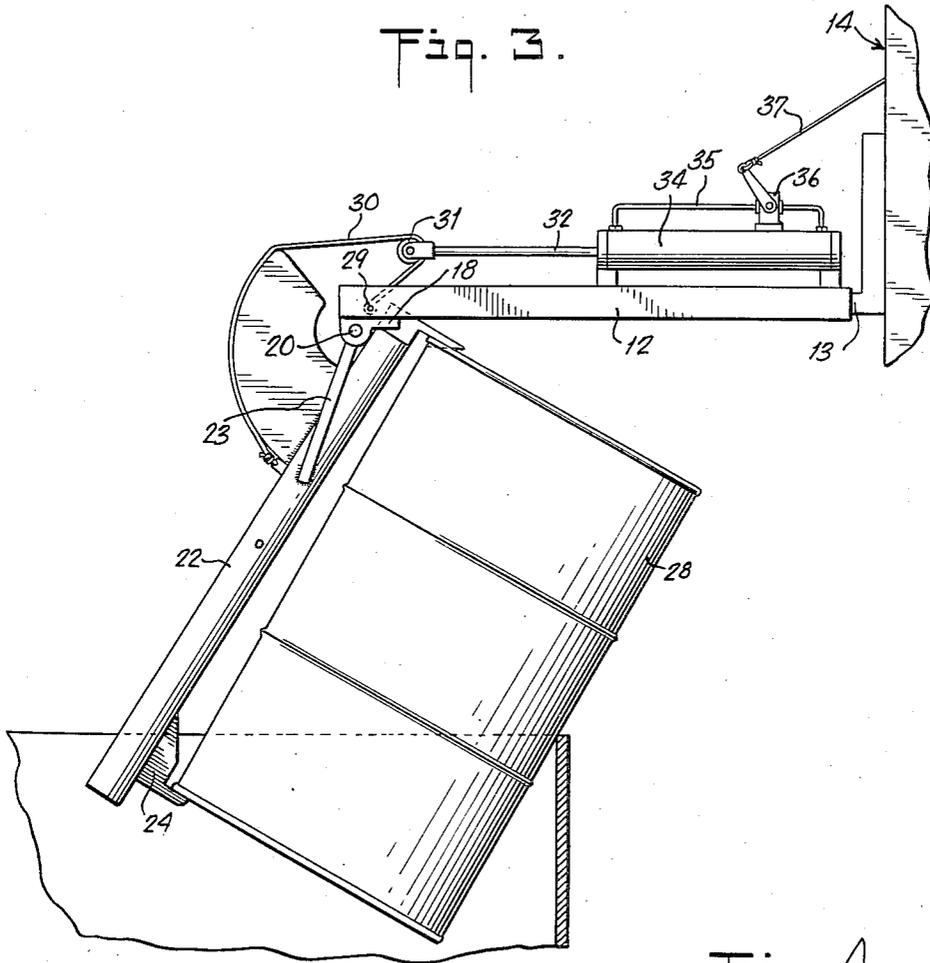
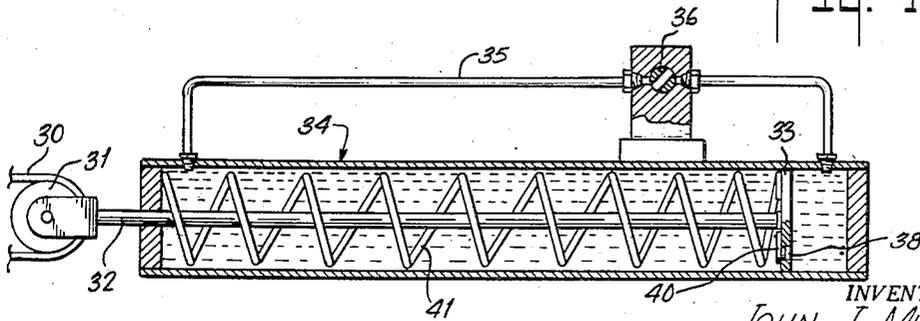


Fig. 4.



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Fig. 5

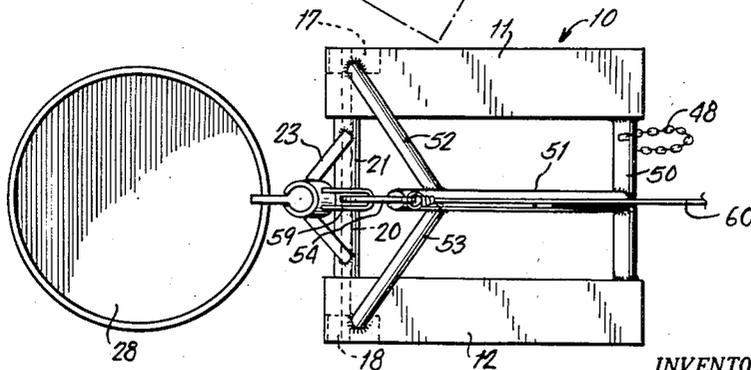
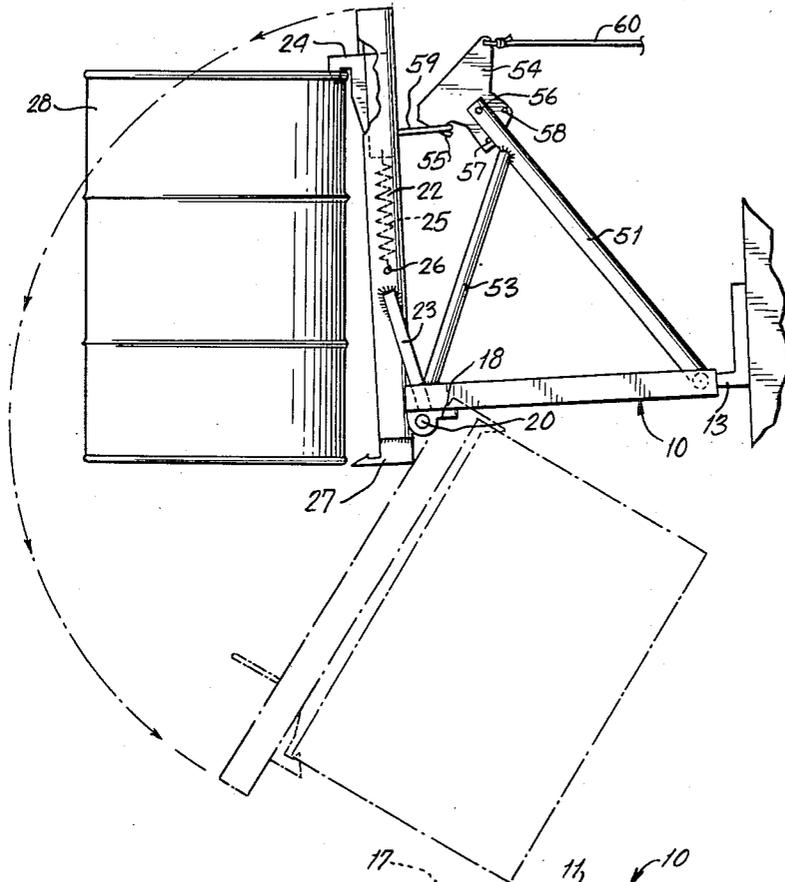


Fig. 6.

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DRUM HANDLING ATTACHMENT FOR FORK LIFT

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Application December 31, 1954, Serial No. 479,156

6 Claims. (Cl. 214-313)

The present invention relates to materials handling equipment and particularly to an attachment for a fork lift truck to enable such a truck to be utilized in the handling of cylindrical containers such as drums of oil, chemicals and the like. The device is also adapted to the handling of other cylindrical containers such as barrels and of special containers, such as boxes and cans.

More particularly still the invention relates to an attachment of the type described which may readily be positioned upon the forks of a fork truck and which is operable to pick up and release containers without the necessity of the truck operator leaving his seat on the truck and which may be utilized to dump the contents under control of the truck operator from his position on the truck. In one embodiment of the invention means are also provided to control the rate of dumping from the truck operator's position, without the necessity of maneuvering the truck and fork elevator mechanism to effect this control. In another embodiment the rate of dumping is controlled through maneuvering of the truck if it is desired to perform operations requiring such control; frequently such rate control is not needed, as, for example, when dumping drums of rubbish.

It is an object of the invention to provide an attachment for a fork truck by means of which it is possible to pick up, dump and release cylindrical containers such as drums, barrels and the like.

It is another object of the invention to provide such a device which may be operated without the truck operator leaving his seat on the truck.

It is another object of the invention to provide an attachment of the type mentioned arranged so that the discharge of the contents of a drum or other container may be initiated by the lift truck operator from his normal position on the truck.

It is still another object of the invention to provide such an attachment for a fork truck by means of which the rate of dumping of a container such as a drum may be controlled independently of any maneuvering of the truck and from the truck control position.

It is a still further object of the invention to provide such an attachment which is readily positioned on the forks of a fork truck without the need of complicated fastening devices and with a minimum expenditure of time.

Other objects and features of the invention will be apparent when the following description is considered in connection with the annexed drawings, in which,

Figure 1 is a side elevational view of the forward portion of a fork lift truck showing the attachment of my invention in place thereon and showing also a drum which has been partially engaged by the attachment;

Figure 2 is a top plan view of the device of Figure 1;

Figure 3 is a side elevational view similar to Figure 1 but showing the position of the attachment parts when a drum has been picked up by the device and is being dumped into a large vat or container;

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Figure 4 is an enlarged cross-sectional view of the braking cylinder which is utilized to control the dumping movements of the device;

Figure 5 is a side elevational view of a second embodiment of the invention which omits a brake which is present in the first embodiment and provides for controlling the rate of dumping only by maneuvering of the lift truck; and

Figure 6 is a top plan view of the device of Figure 5. Referring now to the drawings, and particularly to Figures 1-4 thereof, there is shown at 10 a base member for the lift fork attachment of my invention. This base member comprises the hollow generally rectangular tubes 11 and 12 which are closed at their left hand ends and which are so dimensioned that the usual tines 13 of the fork of a lift truck, a portion of which is shown at 14, may enter into the tubes. Joining the tubes 11 and 12 are the cross-braces 15 and 16 which are rigidly fixed to the tubes 11 and 12 and complete the base 10.

Fixed to the under side of each of the tubular members 11 and 12 adjacent the forward end thereof (the left end as seen in the drawings) is a bracket, the brackets being designated 17 and 18. Mounted in these brackets is a shaft 20 which thus extends across the front of the attachment. Pivotaly mounted on the shaft 20 is a sleeve 21 to which is fixed a mast 22 which extends in a generally vertical direction but in its normal position leans slightly toward the left at its upper end. Extending between the sleeve 21 and the mast 22 are the diagonal braces 23 which hold the mast against movement in a sidewise direction. The mast 22 is hollow and has a slot in the forward edge thereof. A latch member 24 is slidably mounted in the hollow generally cylindrical mast 22 and is spring-urged downwardly by means of a spring 25 fixed to the latch 24 at one end and to a pin 26 fixed in the mast at its opposite end.

Fixed to the mast 22 at the lower end thereof, is a hook 27 which faces upwardly. This hook cooperates with the downwardly facing notch in the latch member 24 to hold a drum such as that shown at 28 in position.

The mast 22 is normally held in the position shown in Figures 1 and 2 by means of a cable 30 which cable is fixed to the mast 22 at one end and to a rod 29 extending between the tubes 11 and 12 at the other end. Intermediate its ends the cable 30 passes over a pulley 31 which pulley is rotatably mounted in a fork forming an extension of a piston rod 32. The piston rod 32 is fixed to a piston 33 (see Figure 4) which operates in a cylinder 34.

The opposite ends of cylinder 34 are connected together by means of a pipe 35 which, intermediate its length, has a valve 36 controlled by means of a cord 37 which extends to a point adjacent the operator's seat on the fork truck.

The piston 33 is provided with an aperture 38 on the left hand side of which a flap valve 40 is positioned. It will be seen therefore that the piston may move to the left at a rate determined by the position of the valve 36 but may move to the right at a rate determined by the size of the aperture 38 which aperture is so large that there is no substantial impediment to the movement of the piston in the direction mentioned. The cylinder 34 is filled with a hydraulic fluid, such as oil. Also the piston is urged to the right by means of a light spring 41.

Referring now to Figures 5 and 6, there is shown a second embodiment of the invention in which the brake is omitted and the mast is held in position by a mechanical latch. Many of the parts of this form are identical with those of the form previously described and are consequently given the same reference characters; the description of these old parts are not repeated.

Mounted on the brace 50 extending transversely of

the base 10 at its rear end is a post or tube 51 which is supported at its forward ends on legs 52 and 53, which legs are supported on base members 11 and 12 respectively; the tube 51 together with legs 52 and 53 thus form a tripod. Pivotaly mounted in a slot in the tube 51 at its forward upper end is a latch 54 formed with a hook 55 adapted to engage a ring 59 rigidly fixed to the mast 22.

Latch 54 is oscillatable about its pivot 56 and is limited in its movement by the stop pins 57 and 58 which strike against opposite sides of the tube 51. Connected to the latch 54 is a cord 60 which is fastened to the lift truck adjacent the driver's position. Thus by pulling upon the cord 60 the latch 54 may be oscillated in a counterclockwise direction to release the ring 59 and mast 22 for rotation about shaft 21.

The device of this invention in either embodiment is readily installed upon the tines of fork truck by lowering the fork 13 against the floor and moving the truck into position with the tines within the channels 11 and 12. Chains such as those shown in Figures 2 and 6 and designated 48 are then passed about the fork to hold the attachment in position thereon.

With either form of the invention the contents of a container may be discharged without utilizing a receiving container; with the first form the rate of discharge may be controlled in such an operation whereas with the second form it cannot.

Reference to Figures 1 and 3 will show that to discharge the contents of a drum such as 28 at a controlled rate it is only necessary after elevating the fork 13 to an extent such that the drum may be rotated to pull on cord 37 to open valve 36 to a desired extent. Fluid can then flow at the controlled rate from the left hand side of piston 33 to the right hand side thereof and the piston 33 will move to the left at a controlled rate. Also the mast 22 and drum will rotate in a counterclockwise direction at a controlled rate the cable 30 lying upon the surface of an arcuate segment 29 fixed to mast 22.

The second form of the invention may, in a similar manner, be used to discharge the contents from a container but in this instance the rate will be uncontrolled, the mast rotating freely about its pivot when released by operation of cord 60 and latch 54.

When the contents of a container has been discharged in either of the manners just above described, the mast may be returned to original position by lowering the lift fork and if necessary backing the truck until the empty drum lies in a horizontal position on the floor. Thereafter, as the truck is backed and lowered the drum will rotate about its rear edge and the mast will come again to the erect position. There is, of course, no resistance to this clockwise movement of mast 22 in either form of the invention. In the first form the flap valve opens to permit unrestricted movement of the piston 33 to the right; in the second form no resistive force is present.

Once the mast is erect the drum may be released from hooks 24 and 27 in the manner described hereinafter.

In operating either form, fork 13 is elevated to an extent such that the latch 24 when in its lowermost position within the mast 22 is above the top of a container such as the oil drum 28 and the truck is driven to a position in which the notch in latch 24 lies above the rim of the drum.

The fork 13 is then lowered until the lower hook 27 rests upon the floor at which time the notch in latch 24 will have engaged the rim of the drum and the spring 25 will have been extended. Due to the fact that the mast 22 tilts forward it is possible for the hook 27 to rest upon the floor in the manner stated. The fork truck is then moved forward slightly, causing the drum 28 to tip so that the hook 27 may move under the bottom flange of the drum. Thereupon a slight rearward movement of the truck positions the lower rim or flange of the drum in the notch of the hook member 27.

The fork is now elevated and the drum transported to

any desired location. The drum may be placed in the new location by reversing the process described immediately above.

If it is desirable to tip the drum in order that the contents may flow therefrom, the truck with the fork 13 still in the elevated position is driven to a position in which the drum rests against a container into which the contents of the drum are to be dumped; preferably with the drum so elevated that a point beneath the center of the drum makes contact with the upper rim of the container. Thereupon the cord 37 or 60 is pulled and the mast with the drum still in position thereon as stated, is released to rotate about the rim of the container, material then flowing from the drum into the container.

As the dumping operation proceeds the fork 13 may be elevated and the truck advanced until the mast and drum assume a position such as that indicated in dotted outline in Figures 3 and 5. When the contents of the drum have been emptied into the container the truck may be backed away from the container thus causing the mast and drum to rotate in a clockwise direction. In the first form of the invention the piston 33 is substantially free for movement in the cylinder 34 due to the provision of the flap valve 40 while in the second form no resistance to such clockwise movement is present. When the container and mast are again in the original nearly vertical position the drum is transported to any desired location, the fork lowered, and the drum released from the mast by a reversal of the operations first described.

While the operation and structure have been described particularly with respect to a drum it will be obvious that other cylindrical containers and, in fact, containers which are not cylindrical but which are provided with top and bottom flanges or rims, may be operated upon in the same manner. It will also be understood that many variations of the device may be made both as respects the particular means of pivoting the mast and as respects the means for permitting rotation of the mast under control of a brake.

I wish therefore to be limited not by the foregoing description which was given for illustrative purposes only, but on the contrary to be limited solely by the claims granted to me.

What is claimed is:

1. An attachment for a fork lift truck comprising, in combination, a base having a pair of spaced tubes adapted to receive tines of the truck fork; a mast pivotally mounted on said base, means on said mast for holding said mast in substantially upright position; said means comprising a hydraulic cylinder having a piston therein and having a piston rod extending therefrom, said piston rod being connected to said mast; and means for releasing said mast for movement about its pivot, said releasing means comprising a bypass for hydraulic fluid from one end of the cylinder to the other, and a manually operable valve in said bypass line whereby the rate of movement of said mast about its pivot may be adjusted by operation of said valve.

2. A device as claimed in claim 1, characterized in that a flap valve is provided on said piston of said hydraulic cylinder, said flap valve permitting movement of said piston freely in the direction opposite to that permitted by operation of said releasing valve.

3. A device as claimed in claim 2, characterized in that a spring is provided urging said piston in a direction to restore said mast to normal position, said spring having sufficient force to move said piston through the hydraulic fluid without exerting restoring force on said mast.

4. An attachment for a fork lift truck comprising, in combination, a pair of tubes adapted to receive the tines of the truck fork, means joining said tubes to form a base and a shaft extending across said base at the edge thereof remote from the lift truck; a mast pivotally mounted on said shaft for rotation in a vertical plane, a hook member fixed to the lower end of said mast, said

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member facing forwardly and having an upwardly facing notch therein adapted to engage the lower flange of a container, a second hook member mounted in said mast for vertical reciprocation, said second hook member facing forwardly and having a notch therein facing downwardly and adapted to engage the upper flange of a container, said second hook member being spring-urged in a downward direction, and means mounted on said base for normally holding said mast in a position slightly inclined from the vertical with the upper end thereof extending forwardly of the lower end, whereby the truck may be placed in position with the fork thereof elevated and the notch in said second hook member above the upper flange of a container, the fork then lowered to engage said second hook member with said upper flange and the lowering continued until said first hook member touches the support on which the container rests, the truck then advanced tipping the container and placing the first said hook member beneath the lower flange with the notch of said member engaging said flange.

5. A device as claimed in claim 4, characterized in that releasing means are provided for said holding means,

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said releasing means being manually operated whereby a container held in said hook members may be elevated and thereafter said releasing means operated to permit said mast and said transported container to rotate about said pivot, thereby permitting the contents of the transported container to be discharged.

6. A device as claimed in claim 5, characterized in that said mast is freely movable from its rotated position to its normal position whereby by manipulating the truck fork, said mast and the container thereon may together be rotated about said pivot point due to contact with a stationary surface to thereby restore said mast to its normal position.

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