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MODIFIED ELEVATOR FOR DRUM HANDLING

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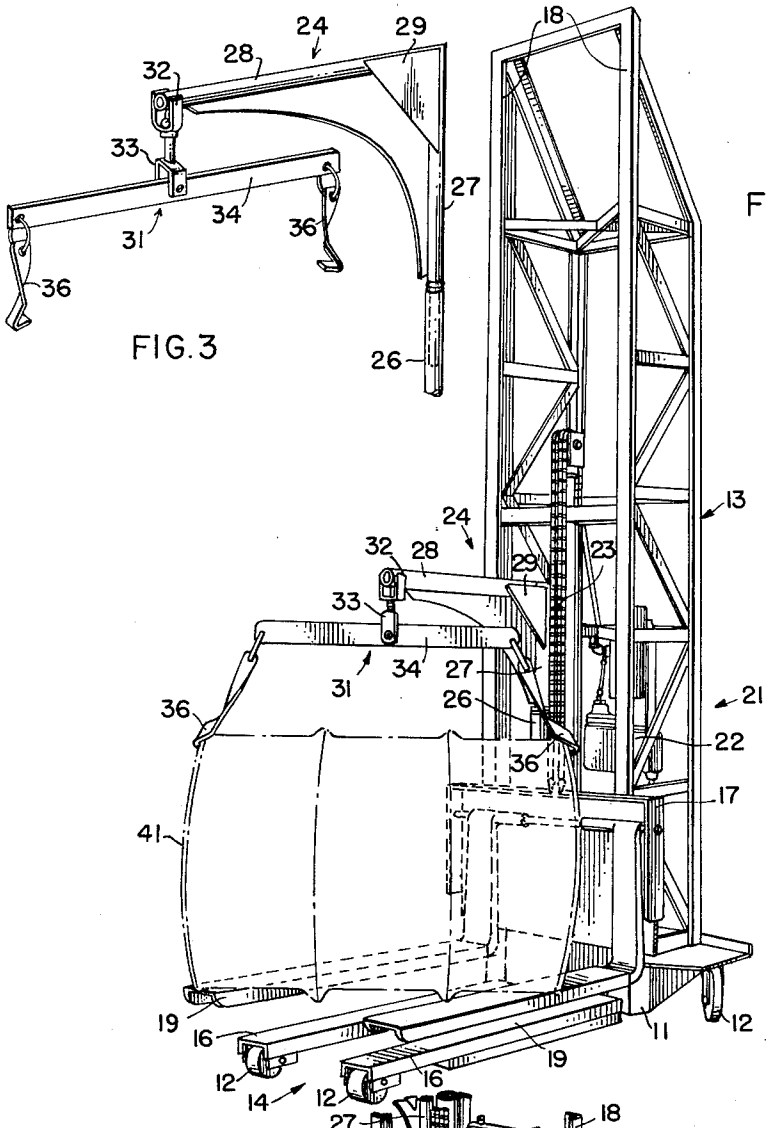
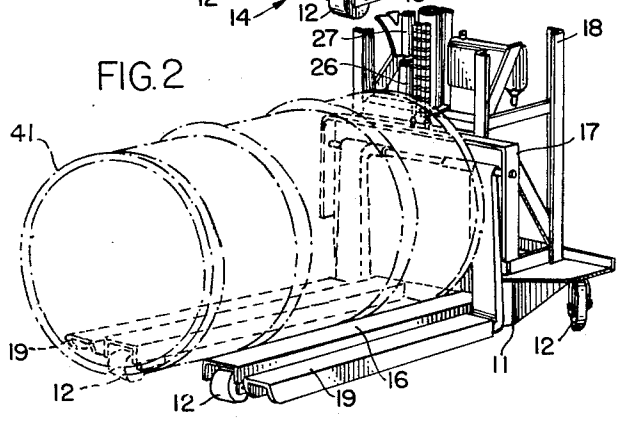


FIG. 3

FIG. 1

FIG. 2



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MODIFIED ELEVATOR FOR DRUM HANDLING

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The present invention pertains to cargo handling equipment and particularly to a mobile elevator for placing paint or lubricant drums or the like on elevated racks.

Barrels or drums of the type used to transport and store many types of industrial liquids such as paint, lubricant or solvents are cumbersome and difficult to handle without the assistance of some mechanical device such as a hand truck and are impossible to elevate to storage racks without utilizing an elevator or high-lift truck. For obvious reasons, these drums are generally placed on the loading dock with their access ports upward and, because of the nature of known hand trucks, are tipped on their side for transportation to the storage area with the access port toward the hand truck or other transporting vehicle. Transfer of the drum from the hand truck to an elevator for rack storage is accomplished by running the hand truck between the lifting elements of the elevator, lifting the drum off of the hand truck, and removing the hand truck. With the drum transferred to the elevator in this manner, the access port is pointing outwardly from the elevator and if the drum is placed on a storage rack in this position, the access port is toward the side of the rack away from the elevator. Where the storage rack is located along a wall, this renders the contents of the drum inaccessible while the drum is in its stored position. It is necessary therefore, to place the drum on the elevator lifting element in reverse position to what it would normally be placed there by the hand truck. This is sometimes accomplished by an auxiliary piece of equipment such as a hoist which lifts the drum from the hand truck, rotates it, and sets it on the elevating mechanism.

The utilization of a third piece of equipment in affecting the transfer of the drum from the loading dock to the storage rack is uneconomical because of equipment investment, operator requirements, and space requirements. It is, therefore, a primary object of this invention to provide a single piece of apparatus for removing the barrel from the hand truck and placing it in the desired position in the storage rack with its contents readily accessible from a selected side.

Another object of this invention is to provide apparatus for handling industrial drums without the need for supplementary racking.

Still another object of this invention is to provide a simple and inexpensive modification for an elevator to perform the drum handling functions as outlined above.

These and other objects of this invention will be apparent from the following detailed description when read in conjunction with the drawings wherein:

FIG. 1 is a perspective view of a cargo elevating apparatus with a drum shown in phantom engagement with the transfer mechanism;

FIG. 2 is a partial perspective view of the elevating mechanism with a drum shown in the initial position; and

FIG. 3 is an enlarged perspective view of the cargo transfer means.

Referring now to the drawings, the elevator is made up of a vertically stationary base 11 supported for lateral mobility on four wheels or rollers 12 and having a stationary lift tower 13 formed of structural steel channels and adapted to guide and support a movable cargo handling mechanism. The stationary base 11 of the elevator includes a bifurcated stationary cargo support 14 comprising two arms 16 parallelly spaced a predetermined distance apart to receive a drum in a horizontal position and positioned a predetermined distance above the floor by the rollers 12.

A movable cargo handling apparatus is slideably attached to the tower 13 for movement in a vertical direction thereon. The movable cargo handling mechanism includes a rigid slide plate 17 slideably mounted in the forward channel irons 18 of the tower 13 with a bifurcated movable cargo support including the parallelly spaced arms 19 which are positioned outwardly of, parallel to, and movable below the stationary supports 16 as is most clearly shown in FIG. 2.

A power unit indicated generally at 21 is positioned in the tower 13 and includes any suitable type motor 22 for driving a hoist chain 23 which is fastened to the plate 17 whereby the movable cargo handling mechanism may be moved to any desired vertical position along the tower 13.

A cargo transfer means indicated generally at 24 is attached to the top portion of the plate 17 in fixed vertical relationship to the movable cargo supports 19. As shown in FIGS. 1, 2, and 3, the cargo transfer means comprises a cylindrical seat 26 secured to the plate 17 in any suitable manner such as welding and adapted to slideably receive a shaft 27 which terminates in an L shaped portion 28 which is structurally reinforced at the bend by the angle plate 29 to insure rigidity of the arm 28 and maintenance under stress of its fixed vertical position relative to the movable cargo supports 19. A drum engaging assembly 31 is attached to the free end of the arm 28 by means of a yoke 32 and is a sub-assembly of the above mentioned cargo transfer means. The yoke 32 is rigidly attached to the arm 28 with the bottom horizontal portion thereof spaced from arm 28 to permit the insertion of a rotatable connector 33 therein. The rotatable connector 33 may be of any suitable structure such as a rotatable shaft or as a ball and socket connector. The connector 33 terminates in a bifurcated yoke with a cargo bar 34 pivotally mounted at its midpoint thereon, the drum bar having an engaging means comprising a pair of drum grabs 36 one positioned at either outer end. The distance of the drum grabs 36 above the movable cargo supports 19 is greater than the diameter of the drums to be handled so that the drum is free of both the movable and the stationary cargo supports after it is engaged.

In accordance with the method of this invention a drum 41 is taken from a vertical position with a hand truck and transported in a partially horizontal position to the area of the storage racks where the hand truck is run between the stationary cargo supports 16 of the elevator and the truck is removed leaving the barrel in a horizontal position thereon. The movable cargo support means then moves to its lowermost position, thus permitting the cargo transfer means 24 to engage both ends of the barrel by means of its drum engaging hooks 36. The cargo transfer means is permanently fixed at a vertical distance above the movable cargo supports 19 so that movement of the movable cargo support means away from the stationary means frees the load which is now suspended on the cargo bar 34 permitting easy rotation of the barrel which is reversed end to end, and the movable cargo support means returned to its lowermost position, thereby resting the barrel on the stationary cargo supports 16. With movement of the movable cargo supports to the lowermost position, the drum engaging hooks will become disengaged. The arm 28 of the transfer means pivoted out of the way, that is, it is manually swung about shaft 27 until it is approximately parallel to the plane defined by the forward channel irons 18. The movable cargo support arms 19 are then moved up past the stationary cargo supports 16 carrying the barrel

41 to the desired height and the elevator mechanism is moved to the selected rack, moving the barrel to its stored position with the selected end thereof accessible.

In operation of the apparatus described above, the movable cargo supports 19 are moved downward past the stationary cargo supports 16 by means of the hoist mechanism. Movement of the movable cargo support means decreases the vertical distance between the drum engaging hooks 36 of the cargo transfer means and the stationary supports 16 while keeping the vertical distance between the movable supports 19 and the barrel grabs constant. This decrease permits the engagement of the drum engaging hooks 36 with the ends of the barrel 41 and the movable cargo support means, including the transfer means, is then moved vertically away from the stationary supports, thereby positively engaging the barrel grabs with the barrel to lift the barrel off of the stationary supports and free of the movable support arms. Following manual rotation of the cargo bar about its pivot mechanism 33, the movable support mechanism is returned to its lowermost position, thereby positioning the barrel once again on the stationary supports 16 but in a reversed position. The transfer mechanism is now pivoted about its shaft 27 out of possible engagement with the barrel and the barrel is lifted by means of the movable cargo support arms 19 driven by the hoist mechanism to position the barrel at the desired level.

While the present invention has been described in a particular embodiment, it is of course understood that changes may be made therein without departing from the spirit and scope of this invention as defined in the appended claims.

What is claimed is:

1. Apparatus for positioning cargo on elevated storage racks comprising: a vertically stationary cargo support having a supporting surface and being positioned a predetermined distance above the floor to receive cargo in a horizontal position; a vertically movable cargo support having a supporting surface and being positioned for movement relative to said stationary support; transfer means attached to and movable with said movable cargo support; hoist means for moving the supporting surface of said movable support through a vertical locus below the support surface of said stationary support; and engaging means included in and rotatable relative to said transfer means for engaging cargo positioned on said stationary cargo support with the movable cargo support in a position near to but vertically spaced from its lowermost position for lifting said cargo from the stationary cargo support responsive to the upward movement of said movable cargo support, the fixed vertical distance between the engaging means and the supporting surface of the movable cargo support being such that the cargo is disengaged from said stationary cargo support when lifted by the transfer means, and is suspended solely by said engaging means.

2. In a mobile cargo elevator having a vertically stationary cargo support for receiving a drum on its side and a vertically movable cargo support, including two horizontally extending arms, adapted to be moved relative to the stationary cargo support to remove a drum therefrom and elevate it to a desired position, drum handling apparatus for facilitating end for end repositioning of a drum comprising: a cylindrical seat secured to and movable with said movable cargo support; a vertical support member rotatably mounted in said seat in a fixed vertical position relative thereto; a horizontal support secured to said vertical support substantially

parallel to said stationary cargo support; a connector rotatably secured to said horizontal support member with its axis of rotation substantially perpendicular to said stationary cargo support and horizontally spaced by a predetermined distance from said vertical support member; a drum engaging assembly secured for rotation with said connector at a predetermined vertical distance above said cargo arms, said predetermined distance being greater than the diameter of the drums to be handled.

3. Drum handling apparatus comprising: a stationary lift tower; a stationary cargo support secured to said tower; a movable cargo support positioned on one side of said tower for vertical movement relative to said tower; said movable cargo support including a rigid slide plate and a pair of spaced parallel cargo arms extending horizontally from said slide plate horizontal to and movable relative to said stationary cargo support; a power unit engaged with said movable cargo support for imparting vertical movement thereto along said tower; a cylindrical seat secured to said slide base; a vertical support member rotatably mounted in said seat in a fixed vertical position relative thereto; a horizontal support member secured to said vertical support member at right angles thereto; an engaging assembly in turn rotatably secured on said horizontal support member a predetermined lateral distance from said slide plate and a predetermined vertical distance above said cargo arms, said vertical distance being greater than the diameter of the drums to be handled, whereby said engaging assembly is adapted to be laterally positioned over a drum to be handled and engaged therewith with said movable cargo support in a position near to but vertically spaced therefrom its lowermost position and lifted free of both the stationary cargo support and the movable cargo support responsive to upward movement of the movable cargo support.

4. Apparatus for positioning cargo on an elevated storage rack so that a selected end of said cargo extends outwardly from the rack comprising: a vertically stationary cargo support having a supporting surface and being positioned a predetermined distance above the floor; a vertically movable cargo support having a supporting surface and being positioned for vertical movement relative to said stationary support; transfer means attached to and movable with said movable cargo support; said transfer means having a cargo engaging assembly attached to said transfer means a fixed distance above said movable cargo support, and being rotatable with respect to said transfer means; and means for lifting said movable support to a selected position above said stationary support; said lifting means being of a design such that said supporting surface of said movable support when in its lowermost position is at a plane lower than that of said supporting surface of said stationary support by a predetermined amount, whereby said transfer means suspends said cargo to facilitate end for end rotation of said cargo after said movable support has been lifted by at least said predemined amount and said cargo has been lifted clear of said stationary support.

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