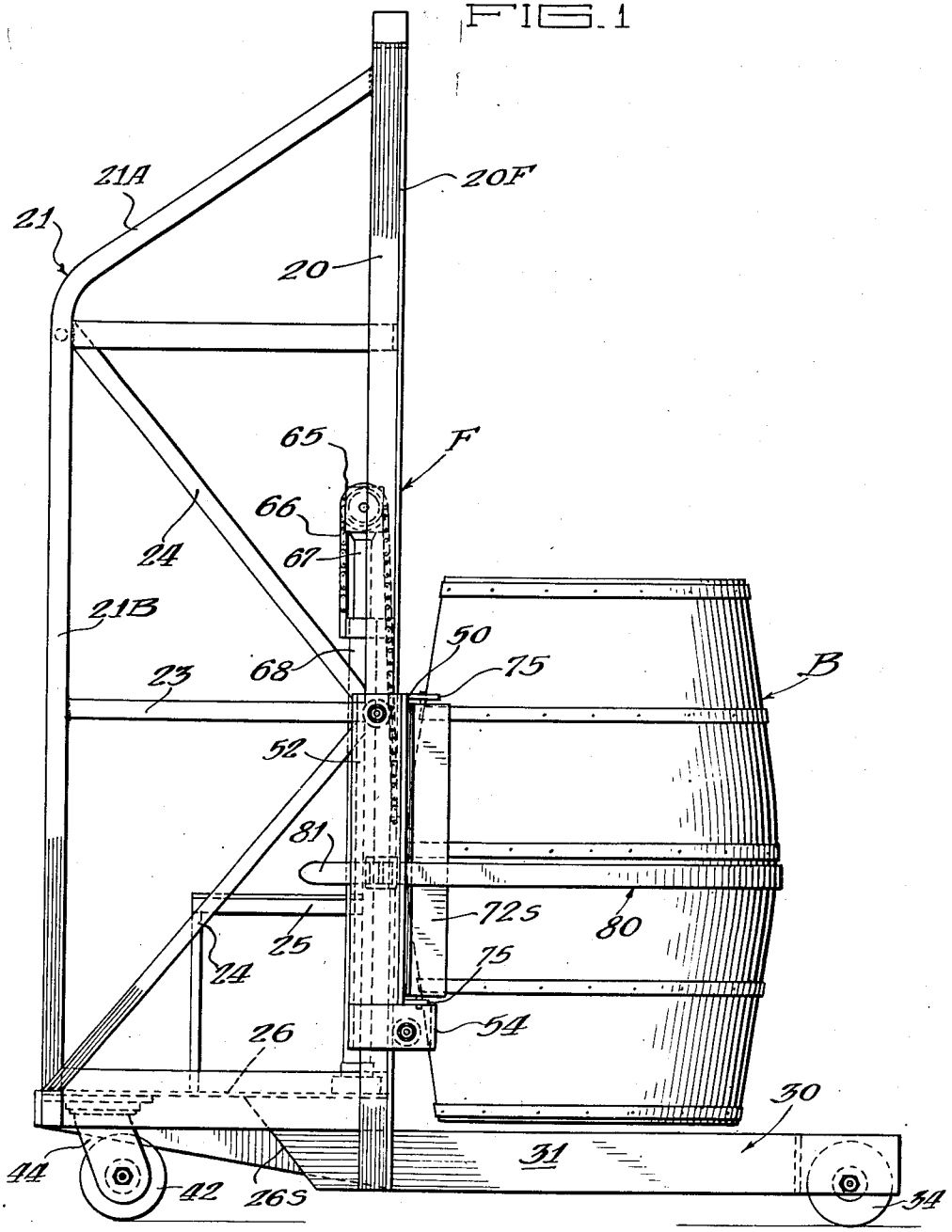
May 10, 1955 F. P. HOPFELD 2,708,048

HANDLING EQUIPMENT FOR BARRELS OR THE LIKE

Filed March 18, 1953 3 Sheets-Sheet 1

FIG. 1



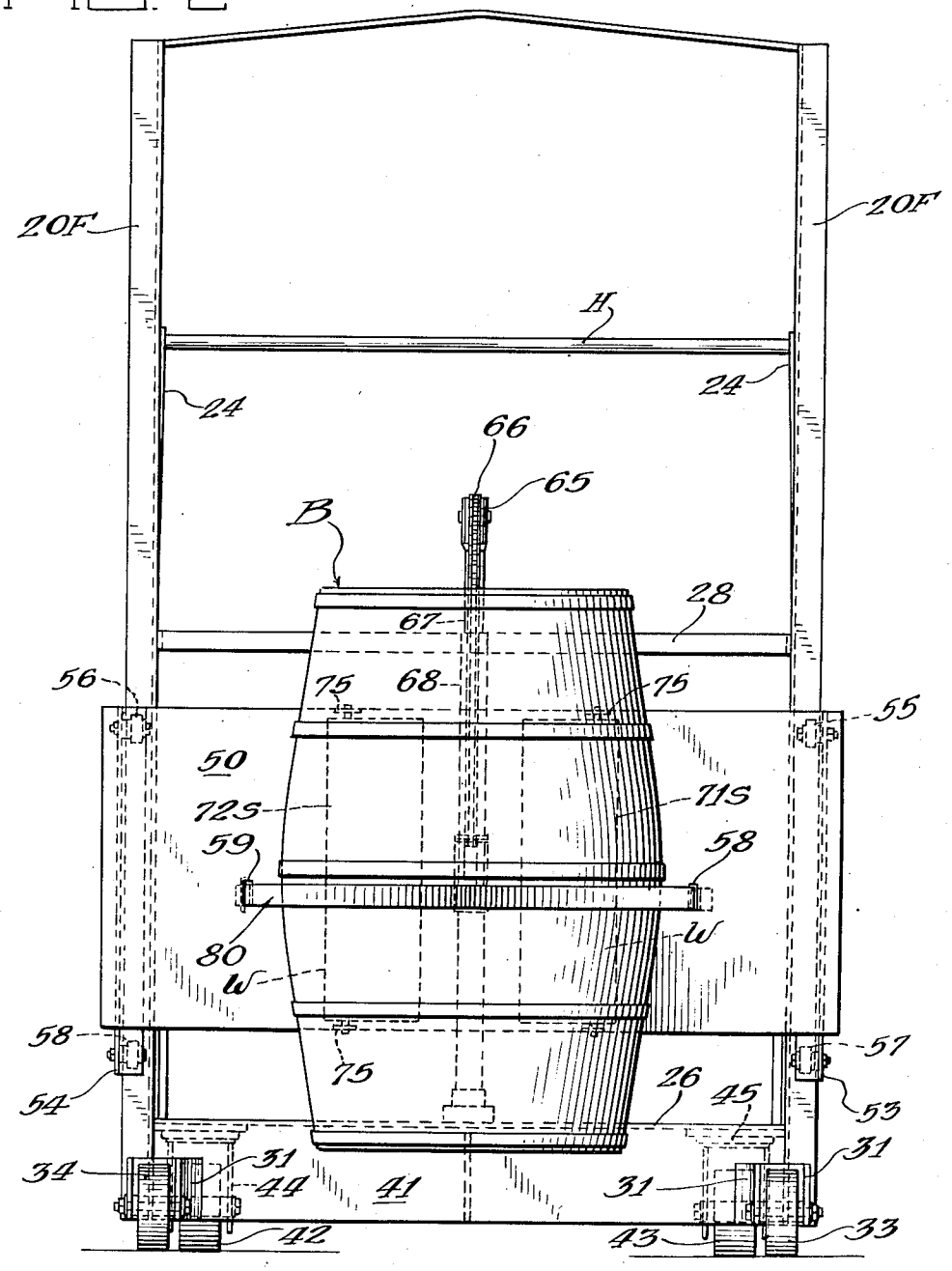
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HANDLING EQUIPMENT FOR BARRELS OR THE LIKE

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FIG. 2



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HANDLING EQUIPMENT FOR BARRELS OR THE LIKE

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FIG. 3

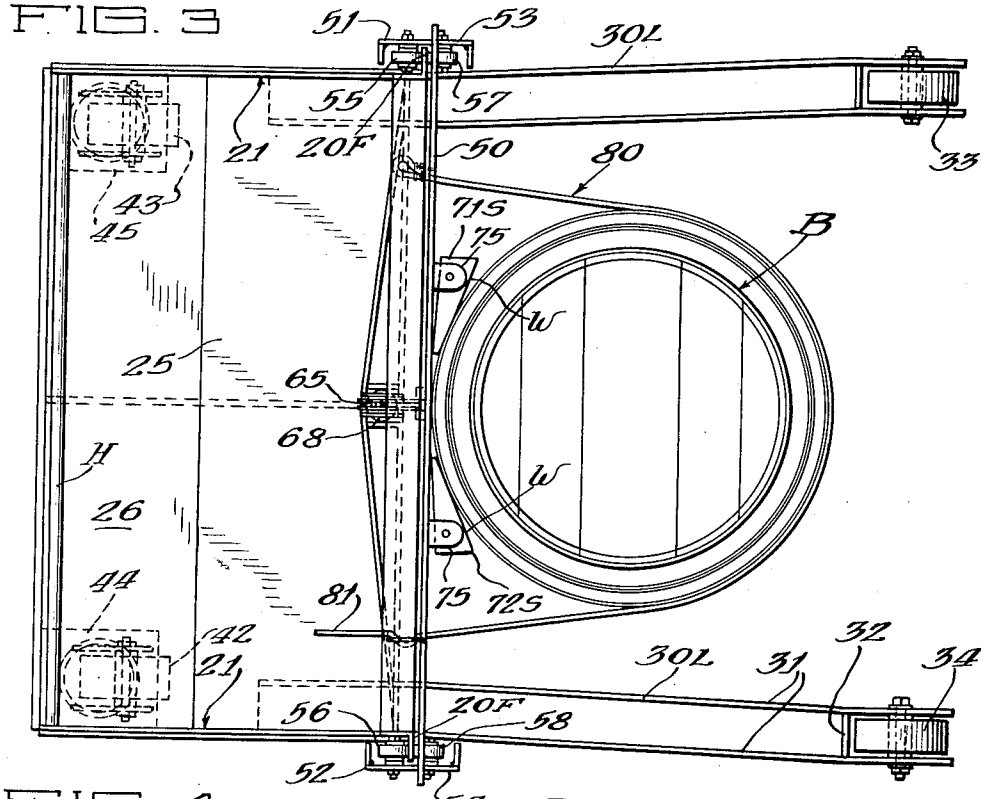


FIG. 4

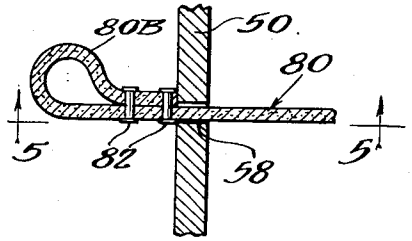


FIG. 6

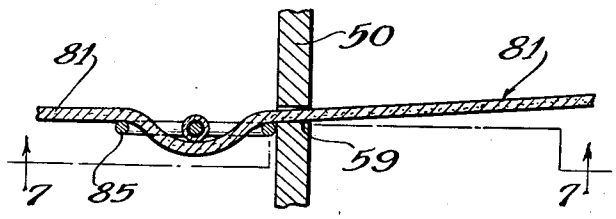


FIG. 5

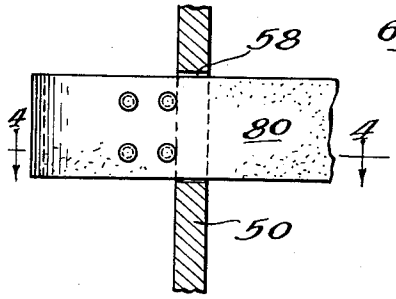
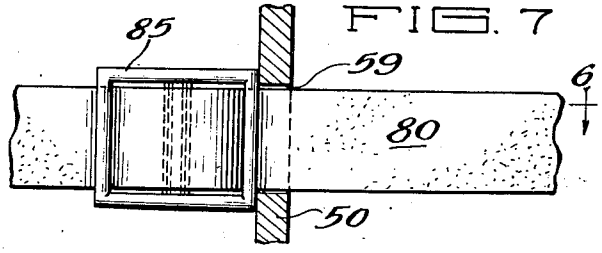


FIG. 7



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2,708,048

HANDLING EQUIPMENT FOR BARRELS OR THE LIKE

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Application March 18, 1953, Serial No. 343,173

4 Claims. (Cl. 214—651)

This invention relates to lifting and transporting trucks of the type which are adapted to perform materials handling operations in shops, warehouses and the like, and more particularly to a lifting and transporting truck that is adapted for handling cumbersome cylindrical objects such as barrels, vats, tubs and the like.

In recent years there has come into general use a type of materials handling equipment in the form of a relatively small truck which is adapted to be guided and propelled manually while handling and transporting relatively heavy or bulky objects from one place to another. This type of truck usually embodies a lifting carriage for lifting and carrying the materials, and the present invention is concerned primarily with such a lifting carriage that is adapted for the handling of materials in the form of cylindrical objects.

Cylindrical objects such as large barrels or tubs, especially when loaded, are quite heavy and difficult to handle. Usually it is difficult if not impossible for one man alone to transport such objects and it is necessary to employ some sort of mechanical lifting arrangement such as is provided in a truck of the type mentioned above. However, as these lifting and transporting trucks have heretofore been constructed with a lifting carriage, it has been necessary to first tip the barrel and then progressively manipulate the same onto the platform for subsequent transportation to the other location. It will be appreciated that this is an awkward operation, particularly in regard to the need for working the barrel back and forth while locating the same on the lifting carriage. The operation is also time consuming and in general is quite unsatisfactory.

In another type of arrangement, a pair of power-operated arms are provided on the truck, these arms being adapted first to grasp the barrel or the like and then lift the same above floor level for transportation. However, trucks of this type are not sufficiently efficient and often times the barrel or similar object slips and falls to the floor. This, of course, creates an industrial hazard. In addition, barrel handling trucks of this type are relatively expensive to build.

Accordingly, it is an object of the present invention to facilitate the handling of cumbersome cylindrical objects such as barrels and tubs, and a closely related object is to dispense with the awkward and time consuming operations that have heretofore characterized attempts to handle material of this sort.

An additional object of the present invention is to construct and arrange a lifting and transporting truck so that cylindrical objects such as barrels and the like may be conveniently handled in an easy, facile, and highly efficient manner.

A further object of the present invention is to construct and arrange the parts in the lifting and transporting truck so that the truck may first be guided toward a heavy barrel or like cylindrical object that is to be handled and the barrel then located on the truck in one simple operation without need for tipping or otherwise working the barrel onto the truck.

Another object of this invention is to provide a safe and sure arrangement for handling heavy, cumbersome objects.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principle thereof and what I now consider to be the best mode in which I have contemplated applying that principle. Other embodiments of the invention embodying the same or equivalent principle may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention.

In the drawings:

Fig. 1 is a side elevational view of a materials handling truck constructed along the lines of the present invention and showing a barrel in slightly elevated position on the truck;

Fig. 2 is a front elevational view of the truck shown in Fig. 1;

Fig. 3 is a top plan view of the truck shown in Fig. 1;

Fig. 4 is a fragmentary detail sectional view showing the manner in which one end of the holding strap may be attached to the truck;

Fig. 5 is a top plan view of Fig. 4;

Fig. 6 is a fragmentary detail sectional view showing the manner in which the loose end of the holding strap is adapted to be tensioned; and

Fig. 7 is a top plan view of Fig. 6.

For purposes of disclosure, the present invention is herein illustrated in Figs. 1 to 7 as embodied in a materials handling truck having a vertical frame structure F and a lower frame structure or base support **30** extending at right angles to one another. The lower base structure mounts front and rear wheels whereby the truck may be moved from one place to another, and the vertical frame structure includes a vertical trackway on which a lifting carriage is mounted for vertical up and down movement.

The vertical frame structure F comprises a pair of forward spaced apart angle members **20** in which the flanges **20F** thereof extend in opposite directions as shown in Fig. 3. Welded to the tops of the frame members **20** are a pair of similarly spaced apart rear frame members **21** that are spaced somewhat rearwardly of the frame members **20**, and these rear frame members each include inclined portions **21A** and straight vertical portions **21B**, the latter which are parallel to the frame members **20**. The vertical frame structure F is reinforced with cross braces **23** and truss-like structure **24**.

The base support **30** is in the form of a pair of generally parallel spaced apart and forwardly extending legs **30L** which are welded to the forward face of a plate **41**, Fig. 2, that extends across the bottom of the frame structure F so that the two frames F and **30** are thereby integrated at the bottom of the frame F. The legs **30L** each consist of a pair of elongated and parallel spaced apart beam-like members **31** which are reinforced adjacent their forward ends with a cross brace **32**. In the small space or housing that is thus provided at the forward ends of the legs **30L** are located a pair of front wheels **33** and **34**.

A lower platform **26**, Figs. 1 and 3, constitutes part of the base structure and is secured to the bottom of the vertical frame structure F. The platform **26** is spaced somewhat above the base structure **30**, as can be seen in Fig. 1, and is reinforced on either side adjacent the forward edge with a pair of supports **26S**. A pair of axle supports **44** and **45** are secured to the underside of the platform **26** adjacent the rear edge, and these

axle supports are provided for a pair of rear wheels **42** and **43** respectively.

As shown in Fig. 2, a handle in the form of a rod H is extended between the rear frame members **21** in the upper section of the frame F in position to be gripped by the operator of the truck, and in this manner the truck may be wheeled and guided by the operator about the shop or factory wherein the materials handling operations are to be performed.

As can be observed from Figs. 1, 2 and 3, the spaced apart legs **30L** define a relatively wide and open space at the bottom of the truck and it will be seen that this permits the truck to be advanced toward any object that is to be handled and transported so that such article will be located between the respective legs **30L**, the operator manipulating the truck in an appropriate fashion by means of the handle H. The manner in which such an article located between the legs **30L** may be lifted and transported by the truck will be described below.

Included in the truck is a movable lifting carriage that is adapted to slide vertically up and down on and relative to a trackway provided on the frame F. The principal element of the lifting carriage is a rather large vertical plate **50**, Fig. 2, which extends from one side to the other across the frame F. This plate **50** carries a means for gripping and securing a barrel, or the like, such as the barrel B, shown in the drawings and in its normal or non-working position is located at the bottom of the frame F.

The lifting carriage is arranged for movement on a vertical trackway in the frame F, and in this regard it will be recalled that attention was earlier directed to the flanges **20F** of the frame members **20** which face forwardly in opposite directions as shown in Fig. 2. Secured to the back side of the vertical plate **50** on and in parallel relation to either side edge thereof are a pair of angle plates **51** and **52** which carry at their tops a pair of rollers **55** and **56** respectively. These rollers **55** and **56** are arranged to roll against the rear face or side of the flanges **20F**. As best shown in Fig. 1, bracket-like plates **53** and **54** are secured to the bottom of the angle plates **51** and **52** respectively, in right angle relation thereto, and these brackets support a pair of rollers **57** and **58** respectively in position to roll against the forward face of the flanges **20F**. From this it will be seen that the rollers **55**, **56**, **57**, and **58**, are effective to locate the plate **50** on the frame F while permitting freedom of the movement thereof in a vertical direction on the frame F.

It will be seen that the lifting carriage thus afforded is conveniently arranged for power operation. For purposes of disclosure, the power drive in the present instance is shown as including a chain **66** which is attached at one end to the back of the plate **50** so that by exerting a vertical upward pull on the chain **66** the lifting carriage may be caused to move upwardly relative to the frames F and **30** on the trackway that is afforded by the flanges **20F**. Such a vertical pull on the chain **66** may be applied through a vertically actuatable piston **67** which has a sprocket **65** secured to its upper end and over which the chain **66** is passed. The other end of the chain **66** is anchored to a horizontal cross bar **28**, Fig. 2, that extends between the vertical frame members **20**. The piston **67** is provided with a cylinder **68**, and the latter is supported in a vertical relation on the platform **26** on the vertical structure F.

By actuating the piston **67** vertically upward in the cylinder **68**, the sprocket **65** will be carried upwardly and the chain **66** will exert an upward pull on the vertical plate **50**. Consequently, the lifting carriage will advance along the trackway of the frame F in an upward direction. This particular type of power drive for the lifting carriage is best adapted for hydraulic actuation, and consequently the hydraulic drive mechanism and necessary connections may be located on either or both the platform **26** and another platform **25** that is arranged in a horizontal plane between the frame element **20** adjacent the platform **26**. The particular power mechanism for driving the lifting carriage constitutes no part of the present invention, and therefore no further discussion in this regard is deemed necessary. Any of the driving arrangements shown and described in U. S. Patent No. 2,560,131, and applications Serial Nos. 315,452 and 321,572, filed October 18, 1952, and November 20, 1952, respectively, may be resorted to.

The lifting and transporating truck shown in the drawings is adapted specifically for the lifting and transportation of cylindrical objects such as the barrel B, and mention has been made above of the fact that the spacing between the legs **30L** at the bottom of the truck permits the truck to be wheeled and manipulated so that the barrel B may be located therebetween with the lifting carriage located behind the barrel. In this connection it should be pointed out that the primary purpose of providing base structure forwardly of the frame F is to lower the center of gravity and thereby lend stability to the truck.

In the drawings, the barrel B has been shown for purposes of disclosure as having been lifted by the lifting carriage to an elevated position somewhat above floor level, that is, above the base structure of the truck and it will be appreciated therefore that during initial operations in which the truck is first advanced toward the barrel B, a somewhat different relationship than that illustrated will exist, the barrel B under such circumstances being supported by the floor of course.

In order that the barrel B may be elevated somewhat above floor level and transported by the truck, it is necessary that the barrel be secured to the lifting carriage, and to this end there is provided a flexible and manually adjustable securing means which is adapted for encirclement of the barrel B to conform exactly to the diameter thereof so as to tie and hold the same to the lifting carriage. Such means in the present instance is in the form of an extremely strong and highly frictioned strap or belt **80** which may be made of belting material or any other material which is tough, flexible and which possesses frictional characteristics adequate to hold the barrel B on the lifting carriage during the time that the latter is being elevated and while the truck is being moved from one position to another in the warehouse or factory.

The belt **80** is relatively long and passes across the forward face of the main plate **50** as shown in Fig. 2. One end of the belt is secured to the plate **50** at one side thereof and the other is arranged for manual tensioning so that the belt **80** may be tightened about the barrel, preferably just below the diameter bulge as shown in Fig. 2. Thus the belt **80** is attached to the main plate **50** in the present instance by passing the belt through a pair of spaced apart, vertically extended slots **58** and **59**, Figs. 4 to 7, that are provided at opposite sides of the plate **50**. As can be observed from Fig. 3, the distance between these slots **58** and **59** is somewhat greater than the diameter of the barrel B. One end of the belt **80** is turned back upon itself and riveted by means of rivets **82**, Fig. 4, so as to afford a loop or bite portion **80B** that prevents this end of the belt **80** from being pulled through the corresponding slot **58** in a forward direction, and this arrangement is effective to secure and attach the belt to the lifting carriage. The other end **81** of the belt **80** is provided with a slide buckle **85** of a known type which is adapted to afford a holding and carrying action by friction when the buckle abuts against a fixed object or surface. Thus, the buckle **85** is free to slide along the belt **80** when the latter is loose or untensioned, this being accomplished simply by holding down the end **81** of the belt **80** and at the same time pushing the buckle **85** along the belt in a forward direction toward the back of the plate **50**. When the belt **80** is tensioned with the forward edge of the buckle **85** advanced along the belt into engagement with the rear face of the main

plate 50 of the lifting carriage as shown in Figs. 6 and 7, the effective length of the belt 80 located between the two slots 58 and 59 will be maintained by the friction lock of the buckle 85 on the belt 80, the arrangement being such that under these conditions the buckle 85 is effective to prevent any part of the belt 80 being pulled through the slot 59 in a forward direction.

It will be appreciated that the buckle 85 simply constitutes one type of arrangement for fastening the loose end 81 of the belt or strap 80, and in this regard there are innumerable alternatives and modifications which may be employed, as well as for attaching the belt 80 to the lifting carriage.

The objects to be lifted and transported by the truck in the instant case will be cylindrical in nature, and therefore cumbersome, and it becomes desirable to assure a degree of stability of such objects on the lifting carriage. Thus, it can be seen that there is a tendency for the object as the barrel B to shift or tilt from side to side when tied to the main plate 50, and this condition is obviated under and in accordance with the present invention by utilizing a pair of supporting blocks in the form of wedge shaped plates 71S and 72S which are located in spaced apart and vertical parallel relation to one another on the forward face of the main plate 50. The blocks 71S and 72S are spaced apart a distance to engage opposite sides of the barrel B, and the forward faces of these blocks are inclined inwardly toward one another and toward the forward face of the plate 50 to afford wedging surfaces W which tend to maintain the initial relationship between the object as the barrel B and the lifting carriage. The blocks 71S and 72S are pivotally supported on the lifting carriage by means of brackets 75, the latter being welded or otherwise secured to the lifting plate 50. In this manner, any tilting or shifting tendency of the barrel B is counteracted or resisted, and the stability of the barrel or other cylindrical object is assured once the particular object being handled by the truck has been effectively tied to the lifting carriage by the strap 80.

In use and operation, and assuming that the barrel B constitutes the object to be handled, the truck is advanced across the floor toward the barrel by the operator who guides the truck on its wheels by means of the handle H. Such advancing movement is continued until the barrel is located between the legs 30L of the truck with the rear of the barrel seated between the stabilizing blocks 71S and 72S. The belt 80 is loose and extended at this time and is looped down over and around the barrel B so as to be in position just below the bulge of the barrel. Then the operator slides the buckle 85 in a forward direction along the portion of the belt corresponding to the loose end 81 until the belt encircles the barrel in exact conformance to the diameter of the barrel. This operation is effective to tie the barrel to the lifting carriage, and the operator can then energize the mechanism which is effective to drive the piston 67 in a vertical upward direction to lift the plate 50 by means of the chain 66 and carry the barrel B to an elevated position such as the elevated position shown in the drawings.

The barrel B that is thus tied to the lifting carriage is then transported to the place desired, whereupon the forces effective to hold the piston 67 in the position corresponding to the aforesaid elevated position of the barrel are released by the operator, and the barrel is lowered again to floor level at which time the belt 80 is removed from the barrel and the truck removed to a new position. It should be mentioned in this connection that where a hydraulic motor is afforded for driving the piston 67 to an elevated position, a slow "bleeding" of the pressure is effective to ease the carriage back down to its normal or at rest position.

From the foregoing it will be seen that the lifting and stacking truck of the present invention, adapted to be used in connection with cumbersome objects such as barrels and the like, affords a ready means for lifting and transporting these articles during a materials handling operation. The use of the strap for tying the barrel or like object to the lifting carriage constitutes a highly efficient means for mounting the object to be elevated on the truck, and maintenance of an open space at the front of the truck eliminates the need for first lifting the barrel up and onto the truck.

I claim:

1. In a truck of the class described for lifting and transporting cumbersome cylindrical articles, a vertical frame structure having a base supporting structure extended at right angles at the bottom thereof, sets of wheels at the bottom of the truck enabling the truck to be wheeled about, a lifting carriage in the form of a vertical plate freely mounted on said vertical frame structure for carrying said objects in an up and down direction, said base structure including a pair of spaced apart legs defining a relatively large and open space in which said article to be lifted may be located with its back against said plate, a flexible strap anchored at one end to said vertical plate for passing over and gripping said article located as aforesaid against the plate, means enabling the other end of said strap to be tightened on said vertical plate after being passed over said article as aforesaid to thereby tie said article tightly to the plate, and a pair of pivotal blocks mounted in spaced relation on the forward face of said plate to engage opposite sides of and stabilize the cylindrical article tied to said plate.

2. In a truck of the class described for lifting and transporting cumbersome cylindrical articles, a vertical frame structure having a lifting carriage in the form of a vertically disposed plate freely mounted thereon for movement in an up and down direction relative thereto, a base support mounted at the bottom of said vertical frame structure and extending at right angles thereto, said base support including a pair of spaced apart legs at either side of said truck to permit the truck to be advanced toward said article to be lifted with the forward side of said vertical plate located against the rear of said article to be lifted, wheels mounted at the front and rear of said truck to permit the same to be moved from one place to another, a flexible strap anchored at one end to said vertical plate and adapted to be passed around said article located against said plate as aforesaid, the other end of said strap being arranged to extend through a slot in said vertical plate whereby the strap may be tensioned about said article located as aforesaid to tie the same to said plate, a sliding buckle on the strap acting between said other end of the strap and the back of the vertical plate to lock the strap to the vertical plate when the strap is tensioned as aforesaid, and a pair of blocks pivotally mounted in spaced relation on said vertical plate having wedge-shaped vertical faces disposed to engage portions of the opposite sides of the article tied to said vertical plate to stabilize the same thereon, said blocks being thus pivotally mounted to accommodate cylindrical objects having different curvatures.

3. In a lifting truck of the class described for lifting and transporting cumbersome cylindrical articles, a vertical frame structure having a vertical lifting plate freely mounted thereon for movement in an up and down direction relative thereto, means to move the plate along said vertical frame structure, wheels mounted at the bottom of said truck to permit the same to be advanced toward a cylindrical article to be lifted, a flexible strap connected at one end to said plate for passing around and gripping said article and tying the same thereto, means on said vertical plate affording a connection for the other end of said strap passed about the article to be lifted, means on the plate to maintain the strap tensioned when passed about said article as aforesaid, and a pair of blocks pivotally mounted in spaced relation on the forward face of said lifting plate having wedge-shaped vertical faces disposed to grip portions at the opposite sides of the cylindrical article tied to said lifting plate to stabilize the same, said blocks

being thus mounted pivotally to accommodate cylindrical objects having different curvatures.

4. In a lifting truck of the class described for lifting and transporting cumbersome cylindrical articles, a vertical frame structure having a lifting carriage in the form of a vertical plate mounted thereon for free up and down movement relative thereto, a base support mounted at the bottom of said vertical frame structure and extending at right angles thereto, said base support including a pair of spaced apart legs at either side of said truck and wheels mounted thereon to permit the truck to be advanced toward a cylindrical article to be lifted with said plate engaging said cylindrical article, a flexible strap anchored at one end on said plate for conforming to the curvature of said cylindrical article located as aforesaid to tie the same to said plate, means affording a slot in the vertical plate removed from the point where the said one end of the strap is anchored thereto and through which the strap may be passed after being passed and tensioned about the article to be lifted which is located relative to said plate as aforesaid, means on the portion of the strap to be passed through said slot adapted to engage the back of

said vertical plate when the strap is tensioned as aforesaid to prevent the strap from slipping, and a pair of wedge-shaped blocks pivotally mounted on the forward side of said plate to engage opposite sides of said cylindrical article to stabilize the same when tied to said plate, the pivotal mountings for said blocks being afforded for the accommodation of cylindrical articles having different curvatures.

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