This invention relates to the general field of lifting and hoisting devices and, more specifically, to an improved fork-type lift device which is of the type utilized for handling heavy cargoes or objects such as, for example, refrigerators.

The invention contemplates, as a still further object thereof, the provision of a fork-type lift including a pivotally mounted offset lift arm.

Still another object of this invention is to provide a lift or hoist of the type generally described supra, with means for limiting the swinging movement of the lift arm.

Still another object of this invention is to provide a flat type lift or hoist which is non-complex in construction and assembly, inexpensive to manufacture and maintain, and a lift or hoist which is durable in use.

Other and further objects and advantages of the present invention will become more evident from a consideration of the following specification when read in conjunction with the annexed drawings, in which:

FIGURE 1 is an end elevation view of a fork-type lift constructed in accordance with this invention;

FIGURE 2 is a side elevation view of the fork-type lift or hoist shown in FIGURE 1;

FIGURE 3 is an enlarged detailed cross-sectional view, FIGURE 5 being taken substantially on the horizontal plane of line 3—3 of FIGURE 2, looking in the direction of the arrows;

FIGURE 4 is an enlarged fragmentary detail cross-sectional view, FIGURE 4 being taken substantially on the horizontal plane of line 4—4 of FIGURE 3, looking in the direction of the arrows; and

FIGURE 5 is a perspective view of the hoist support means including means for detachably connecting the same to the chassis of a vehicle upon which the lift or hoist is to be mounted.

Referring now more particularly to the drawings, the fork-type lift or hoist constructed in accordance with the teachings of this invention is illustrated, in general, by reference numeral 10. The construction of the hoist 10 is such that it may be connected to the ends of a vehicle body or to a side thereof depending upon the loading conditions and the cargo to be loaded, as well as the operator’s preference. In the drawings the hoist 10 is shown as being connected to the rear end of a wheeled truck or other similar vehicle 12 with portions of the hoist 10 extending laterally along a side of the truck 12 and inclining inwardly over the truck bed 14. The truck or vehicle 12 includes conventional rear wheels 16 suspended from conventional chassis means including a pair of longitudinally extending side frame chassis members 18, the chassis supporting longitudinally spaced transversely extending conventional spacers 20 for the support of the truck bed 24. All of the foregoing is conventional with respect to the conventional or truck 12.

The hoist support means designated as 22 at 22 is formed of a normally horizontally extending I-beam 24 to one end of which is connected at substantially right angles, an I-beam riser 26 having an inwardly inclined upper end section which overhangs the I-beam 24. The upper end of the section 28 is integrally connected with a neck portion 30 which is disposed substantially perpendicular to the I-beam 24. To the upper or outer end of the neck portion 30 is rigidly secured, as by welding 32, a substantially cylindrical mounting plate 34. To serve a purpose to be described in detail below, the mounting plate 34 includes a pair of integrally connected upright stop lugs 36, 38 connected to the circumferential side thereof and spaced substantially 180 degrees apart.

As is seen in FIGURES 1 and 2, U-bolts 40 connect the I-beam 24 to the side frame chassis members 18 in such a manner that the I-beam 24 extends transversely therebetween and the I-beam riser 26 is disposed at one side of the truck bed 14 with the riser section 28 and its neck 30 extending across the truck bed 14 in a traversing and overhanging position relative thereto.

An elongated substantially hollow cylindrical standard 42 has one of its ends fixedly secured to the mounting plate 34 centrally thereof, and telescoped over the standard 42 and rigidly secured to the mounting plate 34 is a centrally apertured discoidal bearing race 44 for the antifriction bearings 46. Reference numeral 48 designates an upper centrally apertured discoidal bearing race which is also telescoped over the cylindrical standard 42 and superimposed on the bearings 46. As is seen in FIGURE 4, the bearing race 50 includes a circumferential depending flange 50 which serves as bearing keeper means.

Superimposed on the upper bearing race 48 and telescoped over the cylindrical standard 42 is a substantially cylindrical plate 52 having integrally connected thereto one end of a depending motion limit lug 54 which is adapted to engage against and abut the stop lugs 36, 38 to limit the rotary movement of the plate 52 about the vertical axis of the cylindrical standard 42.

An elongated substantially hollow tubular cylindrical shaft 56 is telescoped over the standard 42, and the lower end of the former is fixedly connected as by welding 58 to the plate 52. As is clearly seen in FIGURES 1 and 2, the upper end of the standard 42 terminates adjacent to but spaced from the upper end of the shaft 56, and connected to the upper end of the shaft 56 is a hollow tubular cylindrical lift arm 58 which projects laterally away from the shaft 56 at an obtuse angle. The outer end of the lift arm 58 has secured thereto a substantially cylindrical end cap 60 from which laterally projects a lug 62 having a centrally disposed opening 64 extending transversely therethrough. Extending through the opening 64 and supported by the lug 62 is the bight portion 66 of a substantially U-shaped hanger bracket 68 having normally depending side arms 70, 72 between which is rotatably mounted on means 74 a pulley or sheave 76.

At longitudinally spaced intervals along the hollow tubular cylindrical shaft 56 are connected, as by welding or any other conventional means, the apices 77 of a plurality of V-shaped braces 78. Each of the braces 78 comprise a pair of oppositely disposed arms 80, 82 which diverge away from the apex 77 thereof, the arms 80, 82 terminating at their respective remote ends in tongues 80A, 82A which are inwardly turned and disposed in confronting substantially parallel relation relative to each other.

The tongues 80A, 82A are welded to the bights 84 of a pair of oppositely disposed vertically extending laterally spaced and confronting U-shaped channel members 86 from the longitudinally extending marginal edges of which project oppositely disposed spaced and substantially parallel flanges 88, 90. Each of the channel members 86 have their respective opposite flanges 88, 90 apertured at 92 at longitudinally spaced intervals to accommodate rollers 94 mounted on shafts 96 fixedly secured to the bights 84. As is seen in FIGURES 2, 3 and 5, the
3 diameters of the rollers 94 are such that portions of the rollers 94 extend across the bights 84 in spaced relation relative thereto. If desired, the arms 80, 82 of the braces 78 may be reinforced by struts 98 which are welded thereto and extend between thereof the outer ends thereof.

Disposed within each of the U-shaped channel members 86 is a second substantially U-shaped channel member 100 disposed in inverted relationship relative to its immediately adjacent L-shaped channel member 86, the channel members 100 each including a bight 102 having projecting from the longitudinally extending margined edges thereof a pair of laterally spaced and substantially parallel flanges 104, 106, the channel members 100 being disposed for reciprocation within the channel members 86 and the flanges 104, 106 have their respective remotely disposed sides rotatably engaged by the rollers 94 during the reciprocation of the channel members 100.

Reference numeral 108 denotes one of a plurality of angle irons which are longitudinally spaced between and are secured to the bights 102 of the channel members 100. Each of the angle members 108 includes an arm 110 and a flange 112 disposed at right angles to the arm 110, the opposed ends of each of the flanges 112 terminating in substantially U-shaped guides 114. Each of the guides 114 includes an arm 116 which engages against the immediately adjacent bight 102 of the channel members 100, a bight portion 118 which extends across the rollers 94 and the flange 88 in spaced relation relative thereto, and a second arm extending parallel to the arm 116 and in spaced confronting relationship relative to the bights 84 of the channel members 86. The lower ends of the channel members 100 is secured a cross brace 122 which is fixedly secured to the opposed bights 102. A ring 124 is fixedly connected to the cross brace 122 intermediate its ends, and to the lower end of the cross brace 122 is rigidly secured the inner ends of a pair of laterally spaced and substantially parallel lifting forks 126.

Referring now specifically to FIGURES 2 and 3 of the drawings, it is seen that a substantially rectangular plate 128 is fixedly secured to and is supported on the lowermost one of the braces 78, and to the plate 128 are affixed a pair of laterally spaced bearing brackets 130 which rotatably support therein the opposed ends of a shaft 132 on which is fixedly secured for rotation therewith a drum 134 of which means 136. One of the ends of the shaft 132 has fixedly connected thereto a ratchet wheel 138 controlled by a detachable or releasable pawl 140 pivotally connected to the plate 128 at 142. To the same end of the shaft 132 is also connected conventional handle means 144. The drum 134 has wound thereon one end of a cable 146 which is trained around the sheave 56 and extends downwardly therefrom behind the angle members 108, the other end of the cable 146 being fixedly secured within the ring 124.

From the foregoing description of the construction of the lift or hoist 10, its operation is deemed to be self evident. However, and by way of explanation, let it be assumed that the component parts of the hoist or lift 10 are in the full line positions shown in FIGURES 1 and 2. Thus, the lifting forks 126 are substantially at ground level and are positioned to receive any given object to be loaded on the truck bed 14.

Assuming that the object to be loaded is in place on the forks 126, the operator now engages the pawl 140 with the ratchet wheel 138 and rotates the handle 144 in a clockwise direction. This movement of the handle 144 causes the shaft 132 and, consequently, the winch barrel 134 to rotate in the same direction whereby the cable 146 is reeled on the barrel 134. As the cable is reeled, the forks 126 are caused to be moved upwardly, the U-shaped channel members 86 sliding upwardly in the U-shaped channel members 86 while being slidably engaged by the rollers 94.

After the forks 126 have been elevated to a desired position above the truck bed 14 the shaft 56 is rotated in a clockwise direction (reference being made to FIGURE 5 of the drawings) whereby the forks 126 are permitted to engage against the upper side of the truck bed 14. The article to be loaded is now shifted from the forks 126 onto the bed 14, and the hoist is now free to resume its original position.

The forks 126 are returned to their original starting position by merely rotating the shaft 56 in the reverse or counterclockwise direction (reference again being made to FIGURE 3) and the pawl 140 is again released from the ratchet wheel 138 to permit the U-shaped channel members 100 to defend to their original lowered position illustrated in FIGURES 1 and 2, while the cable 146 is payed out from the winch drum 134.

Having described and illustrated one embodiment of this invention in detail, it is to be understood that the same is offered merely by way of example, and that this invention is to be limited only by the scope of the appended claims.

What is claimed is:

1. A hoist comprising a normally vertical cylindrical standard, an elongated hollow tubular shaft telescoped over said standard and being rotatable about the longitudinal axis of the latter, the upper end of said tubular shaft being offset at an obtuse angle relative to the longitudinal axis of said shaft and forming a lift arm, a sheave rotatably supported for rotation on the outer end of said lift arm, a pair of oppositely disposed laterally spaced, elongated, normally vertical channel members positioned in confronting relation relative to each other and opening towards one another, a plurality of V-shaped bracing members having their respective apices rigidly secured to said shaft at longitudinally spaced intervals and the outer arm portions thereof rigidly secured to said pair of channels at longitudinally spaced intervals, a second pair of laterally spaced, elongated, normally vertical channel members positioned in confronting relation relative to each other and opening away from one another, angle iron bracing means extending between and connecting together said second pair of channel members at longitudinally spaced intervals therealong, said second pair of channel members being slidably engaged within said first pair of channel members, fork lift means fixedly secured to the outer lower ends of said second pair of channel members, which means rigidly supported on said shaft and said first pair of channel members, and a cable having an end thereof connected to said winch means and its other end reeved through said sheave and connected to said fork lift means whereby operation of said winch means effects the raising and lowering of said second pair of channel members and consequently said fork lift means.

2. A hoist comprising a normally vertical cylindrical standard, an elongated hollow tubular shaft telescoped over said standard and being rotatable about the longitudinal axis of the latter, said shaft at its upper end terminating in an offset lift arm having a longitudinal axis disposed at substantially an obtuse angle relative to the axis of said shaft, a sheave mounted for rotation on the outer end of said lift arm, a pair of oppositely disposed laterally spaced, elongated, normally vertical U-shaped channel members positioned in confronting relation relative to each other and opening towards one another, a plurality of substantially V-shaped bracing members having their respective apices rigidly connected to said shaft in longitudinally spaced relation, each of said bracing members having their respective arms fixedly connected to said channel members at longitudinally spaced intervals.
therealong, a second pair of laterally spaced, elongated, normally vertical channel members positioned in confronting relation relative to each other and opening away from one another, angle iron bracing means extending between and connecting together said second pair of channel members positioned in confronting relation relative to each other and opening away from one another, angle iron bracing means extending between and connecting together said second pair of channel members at longitudinally spaced intervals therealong, said second pair of channel members being slidably engaged within said first pair of channel members, a plurality of rollers mounted on said first pair of U-shaped channel members and extending interiorly thereof for engagement against opposed sides of said second pair of U-shaped channel members, fork lift means fixedly secured to the lower ends of said second pair of U-shaped channel members and projecting laterally therefrom in one direction, winch means and a cable having an end thereof connected to said winch means and its other end reeved through said sheave and connected to said fork lift means whereby operation of said winch means effects the raising and lowering of said second pair of U-shaped channel members and said fork lift means relative to said first pair of channel members.

3. A hoist comprising a normally vertical cylindrical standard, an elongated hollow tubular shaft telescoped over said standard and rotatable about the longitudinal axis of the latter, said shaft at its upper end terminating in an offset lift arm having its longitudinal axis disposed at an obtuse angle with respect to the longitudinal axis of said shaft, a cap fixedly secured to and extending across the upper outer end of said lift arm, a lug projecting from said cap and having an aperture extending transversely therethrough, a hanger bracket including a bight portion having a pair of arms projecting laterally from the ends thereof and in the same direction as bight portion being loosely received within said aperture formed in said lug, a sheave disposed between said bight and said hanger bracket, means pivotally connecting said sheave on said arms, a pair of oppositely disposed laterally spaced, elongated, normally vertical channel members disposed in confronting relation relative to each other and opening towards one another, each of said channel members having oppositely disposed flanges and an interconnecting bight, each of said oppositely disposed flanges having a plurality of longitudinally spaced openings formed therein, a plurality of rollers mounted on rotation of each of said channel members with said rollers projecting through said openings and into said channel members, a plurality of substantially V-shaped bracing members having their respective spines rigidly connected to said shaft at longitudinally spaced intervals, the arms of each of said V-shaped bracing members being rigidly secured to said bights of said U-shaped channel members at longitudinally spaced intervals therealong, a reinforcing strut rigidly secured to and extending between the arms of each of said V-shaped bracing members, a second pair of laterally spaced, elongated, normally vertical U-shaped channel members disposed in confronting relation relative to each other and opening away from one another, each of said last named U-shaped channel members including a bight having a pair of longitudinally extending flanges projecting from the marginal edges thereof, a plurality of angle bracing members having their respective ends fixedly secured to said bights of said second pair of U-shaped channel members at longitudinally spaced intervals therealong, flanges of said second pair of U-shaped channel members being disposed within said first pair of U-shaped channel members and slidably engaged by said rollers, said second pair of U-shaped channel members and said angle iron bracing means being reciprocable relative to said first pair of U-shaped channel members, each of said angle irons including a flange having end extensions loosely engaging around each of said first pair of U-shaped channel members and forming guide means, a cross brace fixedly secured to the lower ends of said second pair of U-shaped channel members, fork lift means fixedly secured to said cross brace and projecting laterally therefrom in one direction, winch means, and a cable having an end thereof connected to said winch means and its other end reeved through said sheave and connected to said cross brace whereby operation of said winch means effects the raising and lowering of said second pair of U-shaped channel members and said fork lift means relative to said first pair of channel members.

4. A hoist as defined in claim 3, wherein the lower ends of said first pair of said U-shaped channel members terminate in a horizontal plane substantially in the plane of the lower end of said shaft and the lowermost one of said V-shaped bracing members are rigidly secured to said first pair of U-shaped channel members and said shaft adjacent said lower ends thereof, a substantially rectangular plate extending across and rigidly secured to the arms of said last named V-shaped bracing member, a pair of spaced bearing brackets fixedly secured to said plate, and said winch means including a shaft rotatably mounted on said brackets, a barrel fixedly secured to said last named shaft for rotation therewith and having connected to it said one end of said cable, a ratchet wheel fixedly secured to said last named shaft for rotation therewith, releasable pawl means for engagement with said ratchet wheel, and manually operable handle means connected with said shaft to effect rotation thereof.

5. A hoist as defined in claim 4, and means for supporting said lowermost ends of said first U-shaped channel members and of said shaft in elevated position above a platform on which material is to be loaded or unloaded from thereon, said last named means including a riser adapted for extension along a side of said platform, means releasably connecting said riser to said platform, said riser including a laterally offset section integrally formed with an angle over said platform, said riser section terminating at its outer end in a vertical neck portion, a substantially cylindrical mounting plate fixedly secured to the outer end of said neck portion, a bearing race fixedly connected to said mounting plate and surrounding said cylindrical standard, a plurality of anti-friction bearings disposed on said bearing race, a second bearing race superimposed on said bearings, a second substantially cylindrical plate fixedly secured to said last named bearing race and surrounding said cylindrical standard, and means rigidly connecting the lower end of said hollow tubular shaft to said last named plate.

6. A hoist as defined in claim 5, wherein said first mounting plate is provided with a pair of lugs projecting upwardly towards said second plate, said lugs being disposed in diametrically opposed relationship relative to each other, and a third lug depending from said second plate, said third lug being adapted to engage against either of said first lugs to limit the rotation of said hollow tubular cylindrical shaft about said cylindrical standard.

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