June 7, 1949. J. B. HOUGHTON 2,472,251

HOISTING DEVICE

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FIG. 1

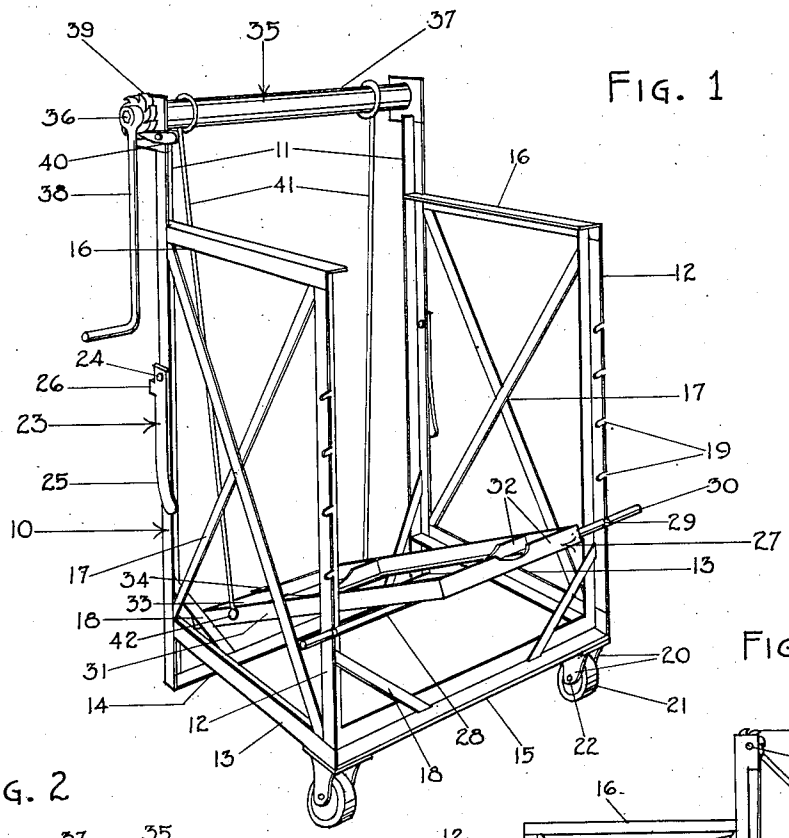


FIG. 2

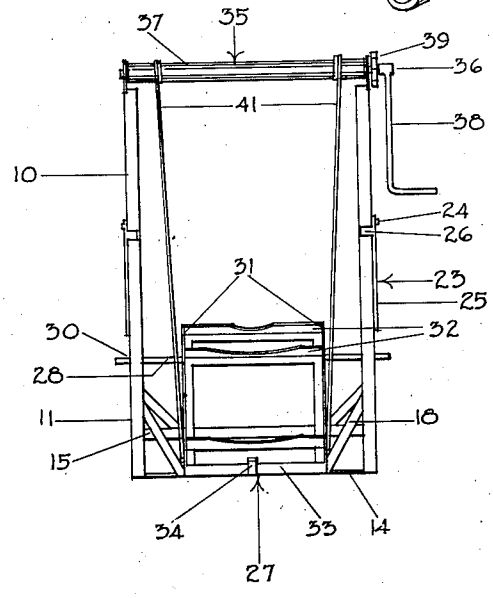
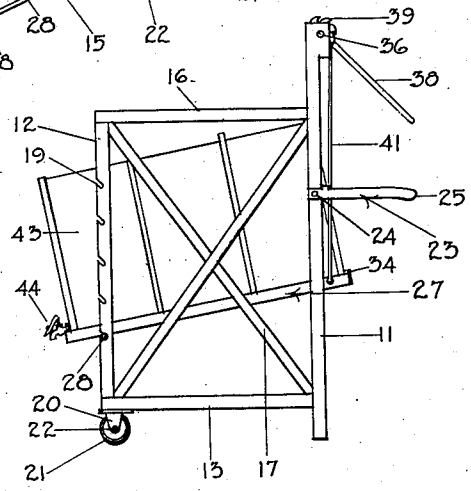


FIG. 3



JOHN . B. HOUGHTON
Inventor

By Kuebner, Maltby & Beehler

Attorney

June 7, 1949. J. B. HOUGHTON 2,472,251

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FIG. 4

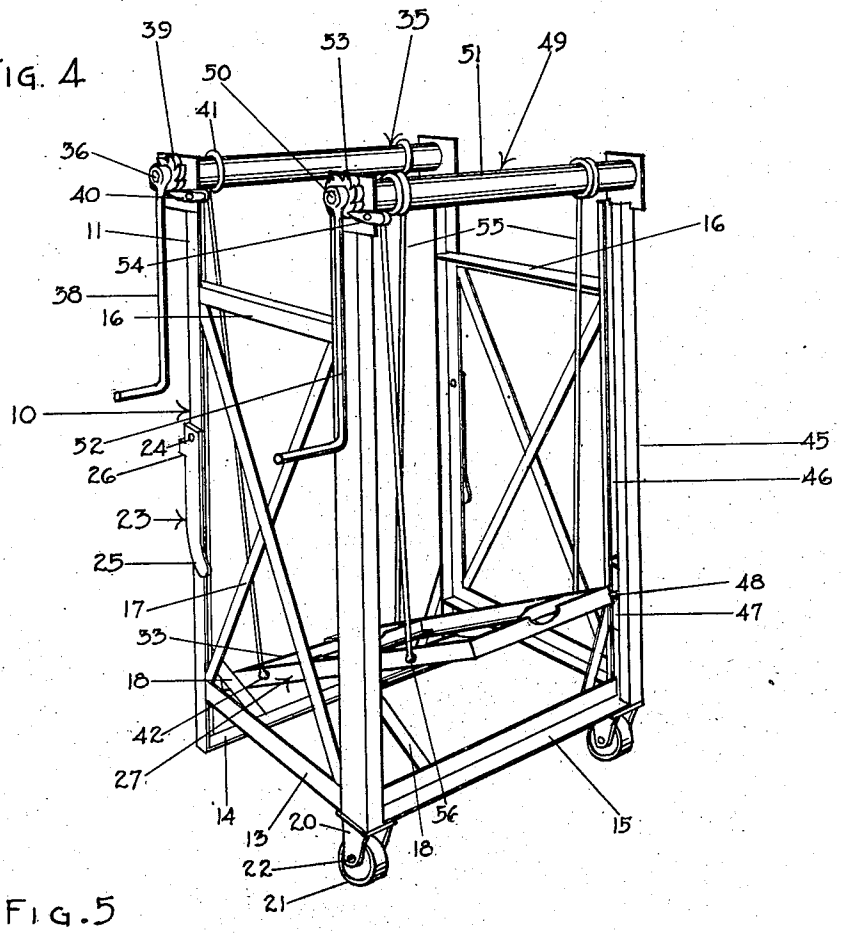
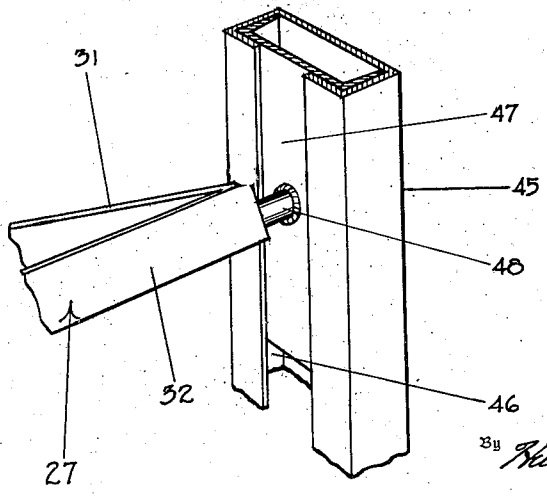


FIG. 5



JOHN B. HOUGHTON
Inventor

By Kuebler, Maltby & Beebe
Attorney

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FIG. 6

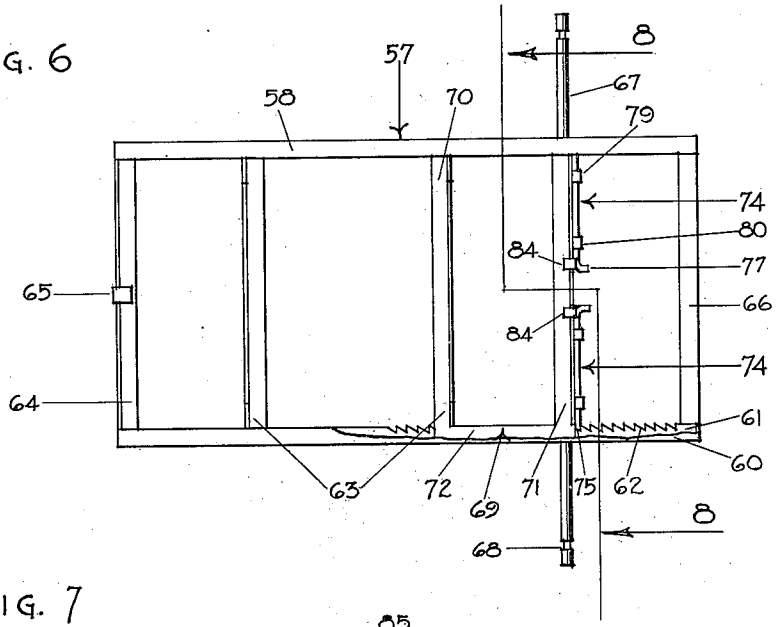


FIG. 7

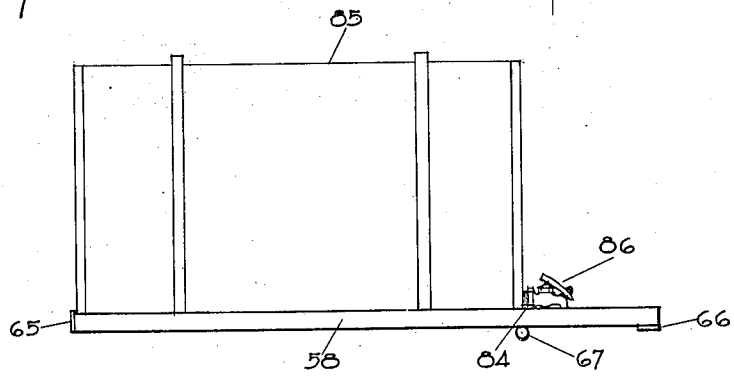
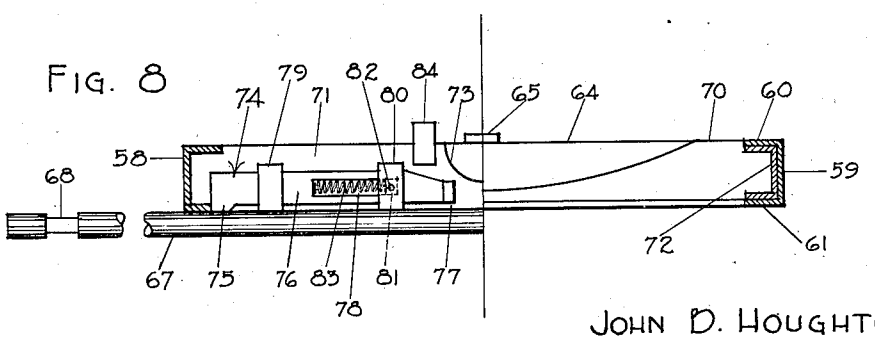


FIG. 8



JOHN D. HOUGHTON
Inventor

By Huebner, Mattis & Beehler

Attorney

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UNITED STATES PATENT OFFICE

2,472,251

HOISTING DEVICE

John B. Houghton, Sanger, Calif.

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5 Claims. (Cl. 248—133)

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This invention relates to hoisting devices and more particularly to drum hoists.

The handling, moving, elevating and tilting of drums, barrels and other similar objects are usually cumbersome tasks. This is particularly true when the object being handled is heavy or bulky and the difficulties are seriously aggravated when the weight of the object shifts about while being moved, as a drum having fluid contained therein.

Objects of my invention are, therefore, to provide a hoist for elevating objects, supporting them at selected elevations, controllably displacing them either way from the horizontal while providing support, and conveniently transporting the same in desired attitude and at a selected height.

Another object is to provide a convenient, manually manipulable drum hoist.

Another object is to provide a support for drums and the like adapted to the raising and lowering of either end thereof or of the entire supported object at will.

Another object is to provide a drum hoist onto which drums may conveniently and easily be placed.

A further object is to provide for the convenient loading and unloading of drums and the like from elevated truck beds, platforms and similar places.

Still further objects are to provide a convenient, economical, sturdy, and mobile hoist and to provide improved elements and arrangements thereof in a device of the character and for the purposes set forth.

In accomplishing these and other objects of the present invention, I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of the device of the present invention.

Fig. 2 is an elevation of the device showing an end thereof which for purposes of discussion is arbitrarily designated as the rear end.

Fig. 3 is a side elevation of the drum hoist showing an oil drum supported thereby in pouring position.

Fig. 4 is a perspective view of a modification of the present invention employing a pair of windlass means for elevating purposes.

Fig. 5 is a fragmentary section of said modification encompassed by the circle 5 of Fig. 4.

Fig. 6 is a plan view of a modified form of the cradle of the present invention providing adjustable securing means for drums and the like.

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Fig. 7 is a side elevation of the same showing a supported drum and spigot in light line construction.

Fig. 8 is a sectional view taken on line 8—8 of Fig. 6.

Referring more in detail to the drawings:

In Fig. 1, a supporting frame is generally indicated at 10 comprising a pair of rear upright posts 11, a pair of front upright posts 12, longitudinal stringers 13, a rear tie beam 14, a front tie beam 15, top stringers 16, diagonal braces 17, and corner braces 18. The said posts, stringers and tie beams are preferably fabricated from angle iron to give the desired rigidity, and the braces 17 and 18 from strap iron, the joints of said supporting frame being secured as by welding. The supporting frame is constructed of such size and strength as to withstand the stresses incident to normal operation without distortion. The shape of the frame is substantially that of a rectangular parallelopiped with the vertical elements of one end, the rear upright posts 11, extended upwardly beyond their intersection with the top elements, top stringers 16.

The front posts 12 have notches, or pivot bar receptacles 19 formed in their outwardly disposed edges, providing a plurality of positions of various elevations in which a pivot bar, presently more fully described may be maintained.

A pair of downwardly extended brackets 20 are secured to the lower front portion of the supporting frame 10. Wheels 21 are rotatably mounted therebetween by axles 22. Further convenience in transporting the supporting frame is furnished by providing handle means 23 pivotally mounted on the sides of the frame near the rear thereof by mounting rivets 24. The handle means are provided with grip portions 25 and have formed thereon inwardly directed angular flanges 26 that engage the posts 11 when said handle means are outwardly extended for operation and thus prevent the handle means from advancing in the upward direction more than is desired.

A cradle indicated generally at 27 is pivotally mounted in the supporting frame 10 by means of a pivot mounting rod 28 transversely disposed and laterally extended from an end portion of the frame. Said pivot rod has formed therein portions of reduced diameter 29 and outer grip portions 30. The portions of reduced diameter are so spaced and of such width as to engage the sides of the front posts 12 when the pivot rod 28 is positioned in the receptacles 19 for operation.

Portions of a pivot rod 67 of reduced diameter similar to portions 29 are clearly shown at 68 in Figures 6 and 8.

The outer end portions 30 provide convenient grips for positioning the pivot rod and cradle supported thereby at predetermined elevations in the receptacles 19.

The cradle 27 comprises longitudinal members 31, transverse drum rests 32 having upwardly disposed concave surfaces adapted to embrace drums or other articles to be supported and transverse stops 33 at the rear ends of said cradle. A finger 34 is secured to the drum stop, and is inwardly disposed to overlay drum rims and thus assist in maintaining said drums on the cradle.

A windlass means is indicated generally at 35 comprising an axle 36 rotatably mounted in the upwardly extended end portions of the posts 11, a cylindrical reel 37, and a crank 38 for rotating the axle and reel at will. As clearly revealed in Figs. 1 and 2, the windlass is preferably mounted in the frame in a position superposed and spaced from the end of the cradle opposite the pivot mounting rod 28.

It is advantageous to be able to secure the windlass means in adjusted position. To this end a ratchet wheel 39 is secured to the axle 37. A ratchet pawl 40 is pivotally mounted on the frame 10 in spaced relation to the ratchet wheel whereby said ratchet wheel may be engaged or disengaged by the pawl as desired to secure the windlass means.

To convert rotational movement of the reel 37 into elevational movement of one end of the cradle 27, cables 41 are secured at one end to said reel and at the other to the free end of the cradle as by means of studs 42.

Fig. 2 reveals elements of the hoist in end elevation for greater clarity. The flanges 26 on the handle means 23 are clearly revealed in a position overlapping the rear posts 11 to engage the same upon upward movement of the handles.

A drum 43 having a spigot 44 is shown in Fig. 3 in light line construction in a supported position on the cradle of the hoist and displaced from the horizontal, as for emptying purposes. The side elevation of the device of the present invention, as shown in Fig. 3, also reveals the handle means 23 in operating position.

Modified supporting frame

A modified form of the present invention is illustrated in Fig. 4. For the front posts 12 in this modification, posts 45 of somewhat dissimilar construction are substituted. Said posts 45 are of box-like structure and have longitudinal openings 46 formed therein in communication with the hollow interiors of the same. The posts and openings comprise guide ways. Blocks 47 are slidably engaged within the box posts 45, as indicated in Fig. 5, maintained within said posts but freely positionable longitudinally thereof.

In this modified form, guide rod 48 is substituted for the pivot rod 28. Said guide rod pivotally mounts the cradle 27 and abuts and is weldably secured to the slide blocks 47.

The posts 45 differ further from the posts 12 in that they extend upwardly from the top stringer 16, as do rear posts 11, in order to provide greater freedom of movement of the cradle and supported objects.

A second windlass means 49 is rotatably mounted in the upwardly extended end portions of the posts 45 in a substantially parallel relation to the first windlass means 35. Said second windlass means 49 comprises an axle 50 rotatably mounted in said upper end portions of the posts 45, a reel 51 mounted thereon between said posts and a crank 52 for imparting rotation to the said axle and reel. A ratchet wheel 53 is secured to the windlass means and a ratchet pawl 54 is pivotally mounted on the supporting frame in spaced relation to said ratchet wheel.

Cables 55 translate rotational movement of the windlass means 49 into elevational movement of the cradle by each having an end secured to the reel 51 and an opposite end secured to the cradle as by means of studs 56.

So mounted, the cradle may be elevated or lowered at will and displaced as desired from a horizontal position by manipulation of the respective windlass means, the movement of the cradle being constrained to substantially vertical paths by the engagement of the slide blocks within the posts 45.

Modified cradle

It is frequently desirable to secure the drum in the cradle during the manipulating operations. To this end a modified cradle 57 somewhat similar to the cradle 27 is illustrated in Figures 6, 7, and 8. The drums to be secured being of varying length, a securing means adjustable in relation to such length, is provided.

The modified cradle 57 has longitudinal members 58 somewhat similar to members 31 in the already described embodiment of the present invention. Members 58, however, are preferably constructed of channel-iron positioned on edge, said channel iron having a web portion 59 an upper lip portion 60 and a lower lip portion 61, as shown in Fig. 8. The lower lip portion 61 is serrated to provide ratchet teeth 62 as illustrated in Fig. 6.

The said longitudinal members 58 are secured in spaced relation to each other by means of drum rests 63 similar to drum rests 32, already described. A drum stop 64, similar to stop 33, also already described, is secured transversely to the cradle at the rear end thereof. A finger 65 is mounted on the stop 64 and is directed inwardly relative to said cradle to overlay rims of supported drums and thus assist in securing said drum on the cradle. A tie piece 66 is secured to the longitudinal members 58 at the front end of the cradle to preclude spreading of the same.

A pivot rod 67, somewhat similar to pivot rod 28, is employed to mount the cradle in the supporting frame as described. Said pivot rod 67 also has portions of reduced diameter 68 for engaging receptacles in the supporting frame, such as 19.

An adjustably positioned framework 69 comprises a rear transverse strut element 70, a front transverse strut element 71 and runner elements 72. The rear strut 70 has an upper concave surface to permit said strut to slide under a drum supported in the cradle. The front strut 71 is notched, as at 73, to permit convenient access to the spigot of a supported drum. The struts are of such length as to hold the runner elements 72 in engagement with the channels of the longitudinal members 58 and yet not of such length as to cause said runners to bind therein.

Bolt elements 74 are provided to engage the ratchet teeth 62 and maintain the framework 69 in adjusted position. Said bolts comprise a beveled engaging portion 75, a body portion 76, and conveniently disposed thumb tabs 77. The body portions 76 of said bolts have formed therein longitudinal spring slots 78.

The bolts 74 are slidably mounted on the forward surface of the transverse strut 71 by means of outer bolt guides 79 and inner bolt guides 80 in a position permitting bolt and ratchet teeth engagement.

A spring stop 81 is positioned within each of the spring slots 78 and the inner bolt guides 80. Said spring stops are secured in position by means of studs 82 screw threadably mounted in said inner guides. To maintain the bolts in proper engagement, helical springs 83 are positioned within the spring slots 78 so as to exert their forces against the spring stops 81 and an end of each of the spring slots 78. So mounted and spring loaded the bolts are maintained in ratchet engagement except when the tabs 77 are forced inwardly to withdraw the bolts from such engagement.

A pair of inwardly disposed fingers 84 are mounted on the framework 69 and directed inwardly to overlay the lips of supported drums, much in the manner of the finger 65, and thus to secure said drums in the cradle.

In Fig. 7, in light line construction, a drum 85 having a spigot 86 is shown supported on the cradle. Attention is directed to the spacing of the fingers 84 to engage the drum on each side of the spigot 86 a sufficient distance from said spigot to permit free operation thereof.

Operation

The operation of a hoist constructed as described is as follows:

The cradle 27 is pivotally mounted in the supporting frame 10 at a selected height by engaging the portions of reduced diameter 29 in selected receptacles 19. The pawl 40 is released and the free end of said cradle lowered as far as possible. So positioned, the cradle is in a tilted position as shown in Fig. 2, its rear, or free, end resting at nearly ground level.

Drum 43 is positioned on the cradle by tipping the same away from the hoist, passing the stop 33 under the bottom thereof, and then tilting the drum into the hoist to recline the same upon the barrel rests 32. The finger 34 then overlays the rim of the drum and assists in maintaining the same on the cradle.

The spigot 44, being on the upper end of the barrel, is then in an exposed position at the front end of the hoist as shown in Fig. 3. If the spigot is not in the illustrated lower position, the drum may be conveniently rotated on the drum rests until in operating position.

The crank 38 is turned to rotate the windlass means, roll the cables 41 on the reel thereof and thus elevate the rear end of the cradle. The pawl 40 is permitted to engage the ratchet wheel 39 when the cradle is in the desired attitude relative to said frame.

It is obvious that this provides a convenient displacing of the drum from the horizontal as for emptying purposes.

To move the hoist and supported drum, the handles 23 are extended as shown in Fig. 3 and the flanges 26 are caused to engage the posts 11 to permit the raising of the rear end of the hoist by lifting on the handles. Thus supported by the handles 23 and wheels 21, said hoist and supported drum may be trundled about at will. When not in use the handles are folded down out of the way as shown in Fig. 1 and Fig. 4.

When the hoist is employed to raise an object such as a drum, as for loading the same on an elevated platform, the pivot rod 28 is preferably placed in receptacles 19 nearly adjacent, but

above, an elevated platform on to which the drum is to be loaded. The drum is placed on the cradle in the manner described. The windlass means is rotated to lift the free end of the cradle, and to tip the cradle toward the platform on which the object is to be loaded. By continuing the elevation of the free end of the cradle, the supported object is tipped from the cradle and caused to slide onto such a platform.

To unload an object from such an elevated platform a substantially reverse procedure is followed.

Operation of supporting frame modification

The modification of the supporting frame is operated similarly to the preferred embodiment but with these differences.

The front end of the cradle 27 is not retained at a predetermined fixed elevation as is done by the receptacles 19 of the preferred embodiment but provides for the raising or lowering of the front end of the cradle at will. Similarly to the raising and lowering of the rear end of the cradle by turning the windlass crank 38, the front end of the cradle is positioned in response to the manipulation of the windlass means 49. To secure the windlass means when the front end of the cradle is in desired position, said windlass means is provided with the ratchet wheel 53 engaged by the pawl 54 mounted on one of the posts 45.

Swinging of the cradle 27 on the cables 41 and 55 is prevented by the pivoting of the cradle on the guide rod 48 and the securing of the guide rod to the slide blocks 47. As the windlass means 49 is manipulated the blocks 47 are drawn upwardly or permitted to descend in the guide ways of the posts 45 in response to said manipulation. The guide ways through their confining of the blocks constrain the guide rod 48 and the end of the cradle attached thereto to predetermined paths of movement.

By the individual manipulation of the windlass means 35 and 49, the cradle 27 and objects supported thereon may be elevated and positioned in attitudes relative to the supporting frame as desired.

Operation of the cradle modification

The modified cradle 57 is operated substantially as is the preferred embodiment of the same but with these added advantages. When it is desired to secure objects, such as drums, on the cradle the bolts 74 are retracted from engagement with the ratchet teeth 62 by pressing the thumb tabs 77 toward each other and the framework 69 is slid forward in the cradle a sufficient distance to permit the drum to be loaded. The drum is positioned on the cradle 57 in the manner already described for cradle 27. The drum is then secured on the cradle by thrusting the framework 69 rearwardly causing the fingers 84 to overlay the top lip of the drum and finger 65 to overlay the lower lip thereof much in the manner of finger 34 already described. As the framework is thrust rearwardly the bolts 74 ratchet rearwardly on the teeth 62 and oppose any forward movement of said framework when in adjusted position.

To release a drum so secured in position, the thumb tabs 77 are pressed inwardly to retract the bolts 74 and the framework is released from engagement.

Although I have herein shown and described my invention in what I have conceived to be the

most practical and preferred embodiments, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein, but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices and systems.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A drum hoist comprising a supporting frame, a cradle having opposite laterally extended pivot means near an end portion thereof, the frame having pairs of receptacles formed therein to receive the pivot means at selected elevations, a windlass mounted in the frame in a position superposed and spaced from the end of the cradle opposite the pivot means, flexible tension means interconnecting the windlass and said opposite end of the cradle, and a ratchet means associated with the windlass for locking the same in selected positions.

2. A drum hoist comprising a supporting frame, a substantially rectangular drum cradle pivotally mounted near an end portion thereof at predetermined elevations in the frame, a framework longitudinally slidable in the cradle to accommodate drums of various lengths, ratchet teeth formed in the cradle, slide bolts borne by the framework releasably engaged with the ratchet teeth to secure the framework in position in the cradle, a windlass mounted in the frame in a position superposed and spaced from the end of the cradle opposite the pivotal mounting thereof, cables interconnecting the windlass and said opposite end of the cradle, and a ratchet means associated with the windlass for locking the same in selected positions.

3. A drum hoist comprising a supporting frame, a cradle having opposite laterally extended pivot means near an end portion thereof, the frame having pairs of receptacles formed therein to receive the pivot means at selected elevations, a windlass mounted in the frame in a position superposed and spaced from the end of the cradle opposite the pivot means, and flexible tension means interconnecting the windlass and said opposite end of the cradle.

4. A drum hoist comprising a support frame having a pair of parallel erect posts therein, said posts having pairs of horizontally related receptacles formed therein outwardly disposed the frame, a cradle having opposite laterally extended pivot means near an end portion thereof pivotally mounted on the posts by engagement of said pivot means in the pairs of receptacles, said pivot means having circumscribing grooves formed therein spaced to receive the posts when said pivot means are located in the receptacles, a windlass mounted in the frame in a position superposed and spaced from the end of the cradle opposite the pivot means, and flexible tension means interconnecting the windlass and said opposite end of the cradle.

5. A drum cradle comprising a rectangular framework having a pair of substantially parallel longitudinal members bearing inwardly disposed ratchet teeth and a pair of substantially parallel end members interconnecting the longitudinal members in fixed spaced relation, a framework slidably mounted on the longitudinal members for longitudinal movement in the cradle, and slide bolts borne by the framework releasably engaged with the ratchet teeth of the longitudinal members to secure the framework in selected positions in the cradle.

JOHN B. HOUGHTON.

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