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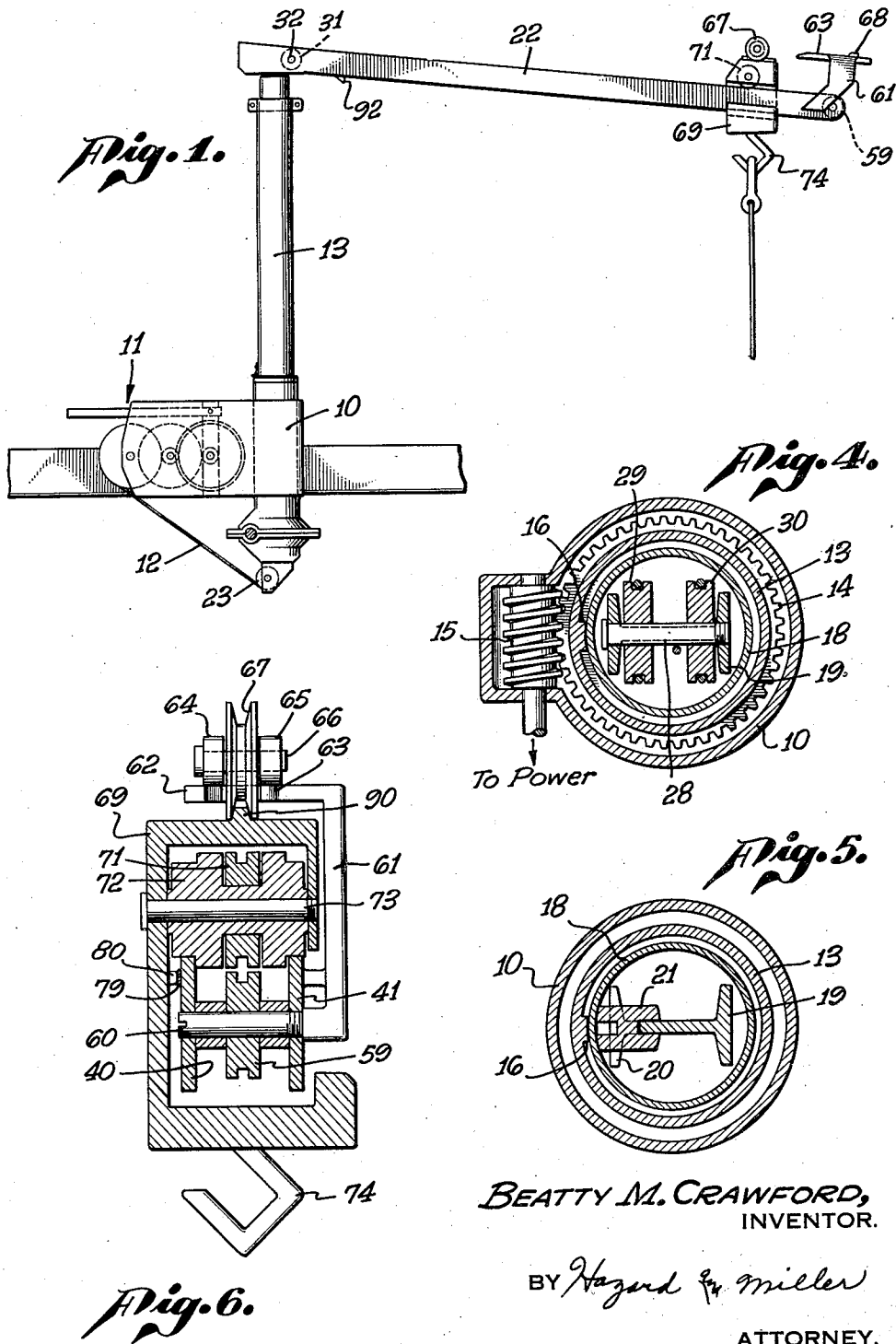
B. M. CRAWFORD

2,369,816

POWER MAST AND BOOM HOIST

Filed July 17, 1943

3 Sheets-Sheet 1.



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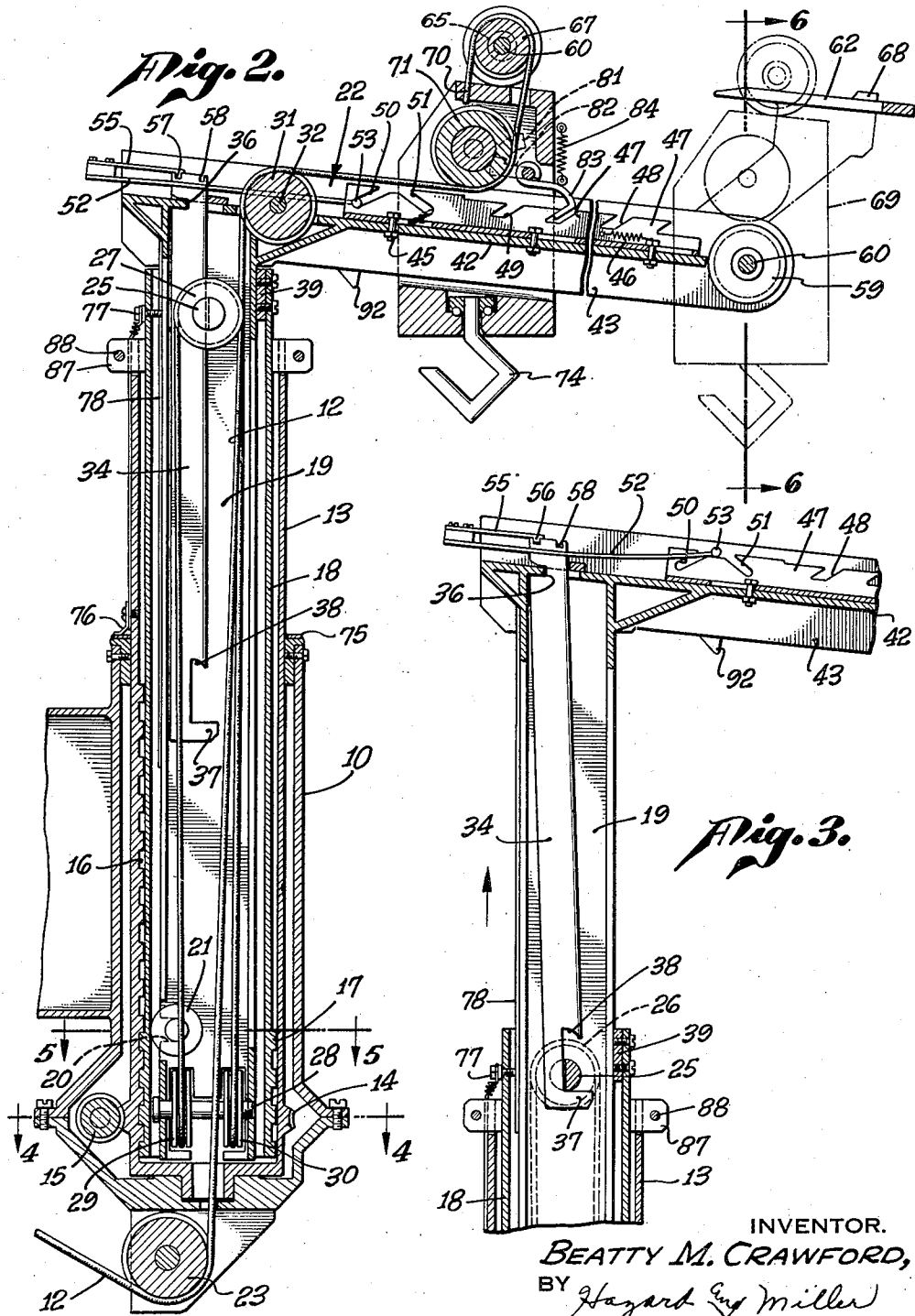
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3 Sheets-Sheet 2



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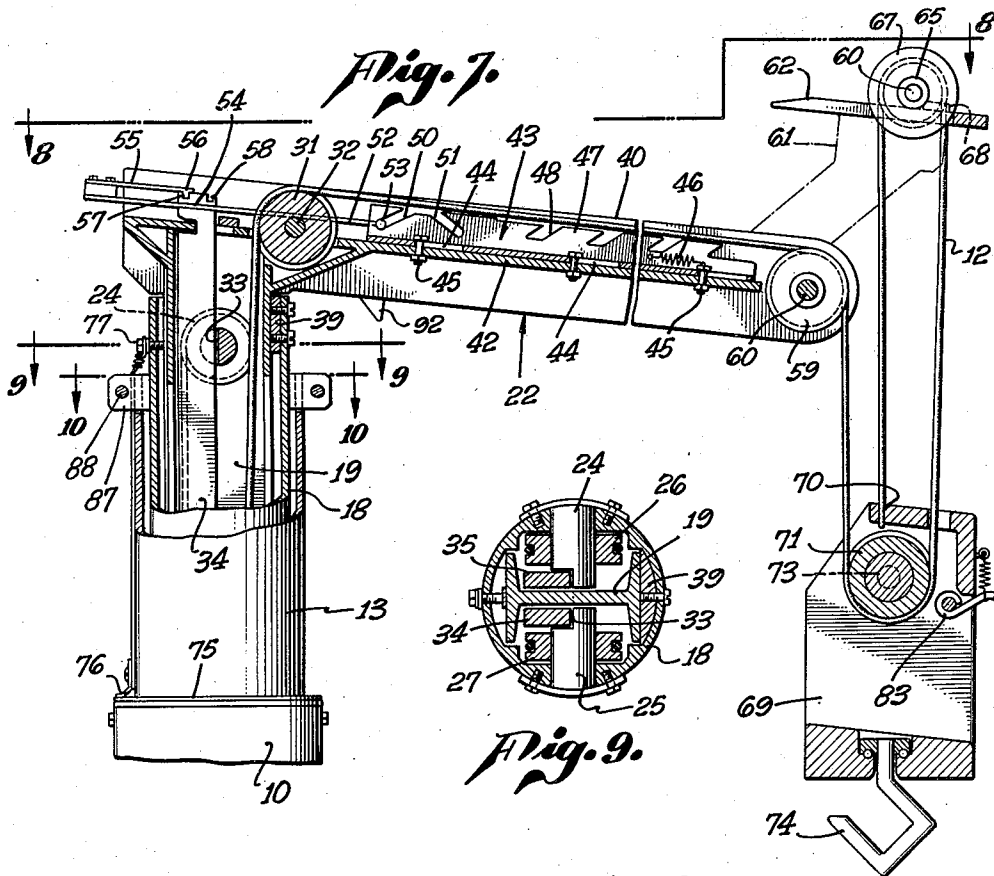
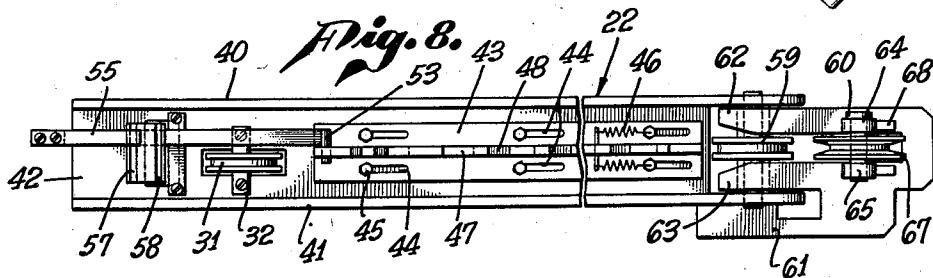
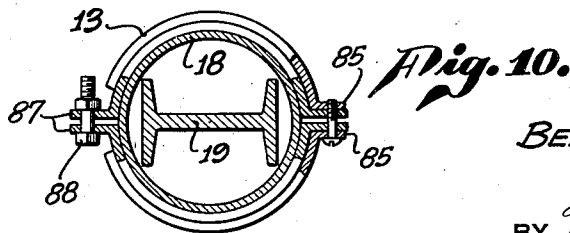
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UNITED STATES PATENT OFFICE

2,369,816

POWER MAST AND BOOM HOIST

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Application July 17, 1943, Serial No. 495,185

18 Claims. (Cl. 212—63)

This invention relates to improvements in power hoists and may be regarded as an improvement over the power hoist disclosed in my prior United States Letters Patent No. 2,101,839 issued December 14, 1937.

In the above-numbered patent there is disclosed a power hoist for use on trucks and the like wherein there is an extensible mast carrying a boom at its upper end which provides a track on which a carriage or travelling block may move. Provision is made for removing the carriage or travelling block from the track on the boom and operating it therefrom so as to enable the traveling block or carriage to be lowered to a position that may be materially below the floor of the truck for loading and unloading purposes. The raising and lowering of the mast and the raising and lowering of the travelling block when suspended from the boom is accomplished by means of a single cable which may be wound upon and unwound from a power-driven winch, the power of which may be supplied from any suitable source of power such as the engine of the truck.

In the construction disclosed in the above-numbered patent when the carriage or travelling block is positioned on the track of the boom, inward and outward movements of the carriage along the length of the boom must be accomplished manually and where the loads are quite heavy, this manual movement is sometimes quite difficult.

An object of the present invention is to provide an improved power hoist having an extensible mast and a boom with a carriage or travelling block that can be transferred to and from the boom and which, when transferred from the boom, is suspended therefrom. The raising and lowering of the mast and the hoisting of the traveling block being accomplished by means of a single cable and characterized by the fact that when the carriage or traveling block is transferred to the boom that inward movements thereon are accomplished by means of the cable, thus eliminating manual shifting along the length of the boom which, as above-explained, is awkward and difficult.

Specifically, an object of the invention is to provide a power hoist having an extensible mast, a boom, a travelling block that may be transferred to and from the boom and when transferred from the boom, the travelling block is suspended therefrom, and to provide a single cable operating means for hoisting the travelling block to the boom, positioning it thereon, drawing it inwardly on the boom and also effecting a raising and lowering of the mast.

Another object of the invention is to provide a power hoist having the above-mentioned characteristics wherein inward movements of the

travelling block may be arrested selectively at various stations.

Another object of the invention is to provide a power hoist having the above-mentioned characteristics wherein the mast and boom thereon may be turned by a power source so as to swing the boom over the desired location where the load may be or where it may be desirable to deposit the load.

With the foregoing and other objects in view, which will be made manifest in the following detailed description and specifically pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention wherein:

Figure 1 is a view in side elevation of the power hoist embodying the present invention;

Fig. 2 is a vertical section through the power hoist illustrating it in that position wherein a load is about to be picked up from the floor of the truck and unloaded therefrom;

Fig. 3 is a partial view in vertical section similar to Fig. 2, illustrating the hoist in that position assumed by the parts after the mast has been extended in performing the unloading operation;

Figs. 4 and 5 are horizontal sections taken substantially upon the lines 4—4 and 5—5, respectively, on Fig. 2;

Fig. 6 is a vertical section taken substantially upon the line 6—6 upon Fig. 2 in the direction indicated;

Fig. 7 is a view similar to Fig. 2, but illustrating the travelling block or carriage as having been transferred from the boom and suspended therefrom;

Fig. 8 is a top plan view of the boom; and

Figs. 9 and 10 are horizontal sections taken substantially upon the lines 9—9 and 10—10 of Fig. 7, respectively.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, the improved power hoist comprises an extensible mast which may be mounted on the floor of a truck, on the floor of a loading dock, or on a deck. It comprises an outer housing 10 associated with which may be a power-driven winch, generally designated at 11, on which may be wound up a cable 12. The winch 11 may be of any suitable construction or preferred design, and if the construction is mounted on a truck, this winch is preferably operable by a friction power take-off such as that disclosed in Figure 1 of my prior patent, above referred to. Any other source of power, however, may be employed to operate the winch.

Within the housing 10 there is disposed an outer sleeve 13 which rests at its bottom on the bottom of the housing and which may be rotated therein. On the lower end of the sleeve

13 there is provided an external worm gear 14 meshing with a worm 15 which can be driven from any suitable source of power, such as for example a power take-off on the truck.

On the interior of the sleeve 13 there are formed segmental threads 16 which mesh with threads 17 that are formed on the exterior of an inner sleeve 18. Thus by rotating worm 15 and consequently rotating sleeve 13, the inner sleeve 18 can be raised or lowered to any adjusted position desired.

Within the inner sleeve 18 there is disposed an I-beam or H-column 19 which has a recess 20 adjacent its lower end to accommodate a grooved roller 21, see Fig. 5, that bears against the interior of the inner sleeve 18. The upper end of the I-beam or H-column carries a boom, particularly designated 22, which extends outwardly and slightly downwardly from the I-beam on the opposite side thereof from that side on which the roller 21 is located.

The means for raising and lowering the extensible mast formed by the outer sleeve 13, the inner sleeve 18, and the I-beam 19 is as follows: On the bottom of housing 10 there is mounted a sheave 23 over which the cable 12 is trained. Near the upper end of the inner sleeve 18 there are disposed two stub shafts 24 and 25, see Fig. 9, which extend inwardly toward opposite sides of the I-beam 19. Sheaves 26 and 27 are rotatably mounted on these stub shafts. Near the bottom of the I-beam 19 the web of the I-beam is removed to accommodate a shaft 28, see Figs. 2 and 4, on which sheaves 29 and 30 are rotatably mounted. These sheaves are consequently rotatable about axes which are in planes at right angles to the axes of rotation of the two upper sheaves 26 and 27. The cable 12 after passing around sheave 23 extends upwardly around sheave 27, then downwardly around sheave 29, upwardly around sheave 26, downwardly around sheave 30, and finally upward around a sheave 31 which is rotatably mounted as at 32 on the boom.

If the upper end of the cable 12, where it passes around sheave 31 is held stationary and the lower end of the cable 12, where it passes around 23, is pulled the four sheaves 26, 27, 29, and 30 function as a four-pulley hoist raising the I-beam within the inner sleeve 18 and consequently elevating the boom 22 that is mounted thereon.

Conversely, if the mast is in its extended or elevated position paying out of the cable 12 will allow the mast to lower and thus allow the I-beam 19 to recede or descend within the inner sleeve 18.

It is desirable to be able to lock the mast in its elevated or extended position, and to this end the inner ends of the stub shafts 24 and 25 are recessed or cut away at substantially a diameter as indicated at 33. Locking bars 34 and 35 are provided which have recesses 36 adjacent the upper ends by which they are swingably mounted from the boom. These locking bars have at their lower ends outwardly extending fingers 37 above which there are shoulders 38. Upward movement of the I-beam 19 relative to sleeve 18 is limited by the fingers 37 on the locking bars 34 and 35 engaging the undersides of the inner ends of the stub shafts 24 and 25 as illustrated in Fig. 3.

If the locking bars are swung from the vertical, as illustrated in Fig. 3, and the I-beam is allowed to descend a short distance the shoulders 38 will engage the upper sides of the inner ends

of the stub shafts 24 and 25 and thus lock the I-beam in extended position, holding it in its elevated position regardless of the tension applied to the cable 12.

A spacer 39 is positioned between the upper end of sleeve 18 and the I-beam and forms a guide or bearing against which the I-beam or H-column may slide during its upward and downward movements.

The boom, generally indicated at 22, is also formed from an I-beam, the flanges of which are indicated at 40 and 41, see Fig. 6, and the web of which is indicated at 42. The top edges of the flanges provide rails or a track for the carriage or travelling block. On the web there is slidably positioned a T bar 43, the flanges of which are slotted as at 44 to receive bolts 45. This T bar is slidable on the web 42 within limits defined by the ends of the slots 44. Tension springs 46 are connected to the T bar and to some of the bolts 45, and urge the T bar toward the right as viewed in Figs. 2, 3, and 8. The upstanding central vertical web of the T bar indicated at 47 has a series of inclined notches 48 formed therein and adjacent the inner end of the T bar there are communicating downwardly divergent notches 50 and 51.

A leaf spring 52 has a finger 53 which, as shown in Figs. 2 and 7, is disposed in the bottom of notch 50. This spring slidably extends through recesses 54 in the opposed faces of the locking bars 34 and 35. A spring latch 55 has a boss 56 thereon which is receivable in either of two grooves 57 or 58 formed on top of the locking bars. Thus, in the position shown in Figs. 2, 3 and 7, the boss 56 is disposed in recess 57. It is possible, however, to spring latch 55 upwardly and then slide the leaf spring 52 toward the right and position boss 56 in recess 58.

The outer end of the web 42 is cut away to accommodate a sheave 59 between the outer ends of the side flanges on the boom. This sheave is rotatably mounted on a pintle 60 and is adapted to have the cable 12 pass thereover when the carriage or travelling block is suspended from the boom, as shown in Fig. 7. Adjacent the outer end of the flange 41 on the boom there is secured an upwardly and outwardly extending arm or bracket 61. This bracket provides an upper pair of spaced short rails 62 and 63 for rollers 64 and 65 that are rotatable on an axle 66, which extend through an upper sheave 67. At the ends of these rails there are stops 68 that are engageable by the rollers to limit outward movement of the rollers and of the upper sheave. The carriage or travelling block consists of a suitable body 69 to the top of which one end of the cable 12 is anchored as at 70. This end of the cable is trained about the upper sheave 67 and then around a travelling block sheave or pulley 71 rotatably mounted on the center of a large wheel or rollers 72 that is rotatable upon an axle 73. This wheel or roller is flanged and serves to roll upon the top edges of the flanges or rails 40 and 41. The bottom of body 69 may be equipped with a swivel hook 74.

On the top of housing 10 there is an insulated conductor ring 75 engageable by a brush 76 regardless of the position to which the outer sleeve 13 may have been turned. This brush in turn is electrically connected to a brush 77 engageable with a conductor strip 78 mounted on the I-beam or H-column. On the outer side of flange 40 of the boom, see Fig. 6, there is a conductor strip 79 to which conductor strip 73

is electrically connected. This conductor strip is engageable by a brush 80 on the inside of the travelling block body 69. Brush 80 is electrically connected to a solenoid 81 disposed on the outer side of the travelling block body. This solenoid when energized serves to magnetically attract an armature 82 on a latch 83 to swing it downwardly for engagement with one of the notches 49. A tension spring 84 urges the latch into normally retracted position.

At the top of the outer sleeve 13 the sleeve is notched and may be provided with outwardly extending ears 85. Semi-circular clamping elements 86, see Fig. 10, are equipped with ears 87 extending outwardly through the notches. These ears are adapted to be tightened together as by a tightening bolts 88. The clamping elements are disposed between the outer sleeve 13 and the inner sleeve 18, and when tightened they serve to lock the inner sleeve against rotation whenever occasion requires.

Assuming that it is desirable to unload from the body of the truck and deposit the load at a lower elevation, such as on the adjacent ground, the hoist is initially positioned in the position shown in Fig. 2, wherein boss 56 is disposed in recess 57. A hitch placed about the load is attached to the swivel hook 74 and tension is applied to the cable 12. This initial tension tends to draw the carriage or travelling block inwardly, that is upwardly on the slightly inclined boom. With the latch 83 in engagement with a notch 49, the T bar is caused to slide inwardly to the limit allowed by slots 44. When the inward movement of the carriage is thus arrested, further tension on cable 12 is effective to elevate the mast. It should be noted that when the T bar is caused to slide inwardly that the finger 53 is caused to slide up to the upper end of notch 50 bending the outer arm of the spring 52 upwardly and thus urging the lock up bars 34 and 35 to swing outwardly. The mast may be elevated by the continued taking in of cable 12 on the winch until the fingers 37 engage the inner ends of the stub shafts 24 and 25, as shown on Fig. 3. When the stub shafts pass over the shoulders 38, the biased spring 52 causes the lock-up bars to swing outwardly as shown in Fig. 3. The cable 12 can then be paid outwardly slowly, allowing the mast to settle until shoulders 38 engage the inner ends of the stub shafts and thus lock the mast in extended position. Further paying out of the cable 12 allows the carriage or travelling block to lower down the slightly inclined boom. As the travelling block reaches the end of the boom, rollers 64 and 65 engage and roll on the upper rails 62 and 63 as indicated in dotted lines on Fig. 2. Continued paying out of the cable allows the travelling block to descend, it being understood that it is then suspended from the upper sheave 67 which is supported by rollers 64 and 65 on rails 62 and 63 against the stubs 68. The cables can then be paid out as far as is necessary to lower the carriage or travelling block any required distance to deposit the load on the ground, see Fig. 7. When the load is detached from the swivel hook 74 the cable is again wound up on the winch serving to first elevate the travelling block upwardly until the top of the body 69 engages the bottom of sheave 67. Preferably there is a bed or ridge 90 formed on the top of the body 69 that fits between the flanges of the sheave 67 to seat the sheave 67 thereon. When the top of the body 69 has engaged the sheave 67 further

winding of the cable is effective to pull the travelling block inwardly and upwardly on the inclined boom. Sheave 67 and its associated rollers 64 and 65 then move with the body 69 of the travelling block as one unit, as shown in Fig. 2. The travelling block is moved inwardly until it engages a stop 92 on the under side of the boom, thus arresting inward movement of the travelling block and causing further takeup of the cable 12 to raise the mast so that the inner ends of the stub shafts 24 and 25 will disengage shoulders 38. During this inward movement of the travelling block it will be noted that the T bar 43 is not disturbed. Hence it will remain in its retracted position under the influence of springs 46. Finger 53 will consequently be at the bottom of slot or recess 50. Spring 52 will consequently not be biased and will allow the lock up bars 34 and 35 to hang vertically. The cable 12 may then be paid out to lower the mast and the boom to pick up another load from the floor of the truck to be unloaded. A second load may then be attached to the swivel hook 74 and the cycle of operation be repeated.

If it is desired to load the truck from the ground a slight adjustment is made. The spring latch 55 is sprung upwardly and the leaf spring 52 is caused to slide outwardly. Boss 56 is positioned in recess 58. This outward sliding movement of spring 52 positions its finger 53 at the top of the juncture of the two divergent recesses 50 and 51. Consequently, after this adjustment has been made the spring 52 is biased to urge the locking bars 34 and 35 outwardly when the T bar 43 is in its retracted position. To pick up a load from the ground, the cable is first wound up on the winch drawing the travelling block into engagement with stop 92. This elevates the mast and when the mast is in its uppermost position on passing out the cable the locking bars will engage the stub shafts 24 and 25 it being understood that this is now accomplished by reason of the fact that spring 52 is normally biased to swing the locking bars outwardly. Further passing out of the cable allows the travelling block to move outwardly on the boom and to be suspended from the upper sheave 67 when it is supported on the bracket 61. The travelling block can then be allowed to descend and be connected to the load. The cable 12 is then wound up on the winch lifting the load and transferring the traveling block onto the boom. As the travelling block is pulled inwardly on the boom the electrical circuit through the solenoid 81 is closed at the proper or desired location causing latch 83 to swing downwardly into one of the notches 49. This arrests inward movement of the travelling block or carriage when the T bar has been caused to slide inwardly, to the end of its movement as governed by the lengths of the slots 44. When the T bar has been thus moved inwardly finger 53 has moved to the bottom of the notch or slot 51 unbiasing spring 52 so that the lockup bars 34 and 35 will tend to hang vertically. Usually the arresting of the movement of the carriage or travelling block takes place slightly before the winding up of the cable 12 has ceased that the mast will be elevated slightly after the inward movement of the traveling block has stopped. This lifts shoulder 38 out of engagement with the stub shafts 24 and 25. The cable is then paid out allowing the mast to descend or collapse and thus deposit the load on the floor of the truck. To pick up a succeeding load, the cable 12 is paid out to allow a slight backward movement of the

travelling block so that latch 83 will no longer bind or be held in the notch that it may have engaged. When the latch is thus released its spring serves to completely disengage the latch from the notched bar on the boom. On winding up the cable 12 on the winch the travelling block may be brought into engagement with stop 92, the mast elevated, and locked up as in Fig. 3. Note that under these circumstances finger 53 will be at the top of notch or slot 51 thus biasing the spring 52 to urge the lock up bars 34 and 35 into locking position. When the mast has been locked up in elevated position the carriage or travelling block is allowed to descend on the inclined boom and to be suspended therefrom as shown in Fig. 7, to pick up a succeeding load.

During some loading or unloading it is possible to turn the mast and boom thereon by hand. However, the present construction enables power to be utilized for this purpose. This is accomplished by clamping up the clamping means 85, 86, 87, and 88 to lock the sleeves 18 and 13 together. The ears 85 of the clamp merely serve to hold the clamping members in place. The clamp members 86 are tightened or loosened by tightening or loosening bolt 88 extending through ears 87. These members when tightened lock the sleeves 18 and 13 together. When these sleeves are locked together on rotating worm 15 the mast turns as a unitary structure.

In some instances, the load is either loaded or unloaded in tiers. If the inner sleeve 18 is in its lowermost position, as shown on Fig. 2, the construction is susceptible of loading or unloading a lower tier. However, if it is desired to load or unload an upper tier the hoist may be adjusted for this purpose by holding the inner sleeve 18 against rotation and rotating the outer sleeve 13 by the worm. This causes the screw teeth or threads 17 to climb the segmental threads 16 elevating sleeve 18, and the contained structure to a higher position than that shown. When so adjusted the construction may be operated the same as previously explained.

Proper practice is to adjust the mast to the desired height to handle conveniently the maximum height of the load to be handled. A chain or sling is used to connect the load to swivel hook 74 and if the load consists of cotton bales, the structure is adjusted so as to conveniently deposit a layer or tier of cotton bales on the floor of the truck. The chain or sling can then be hooked up or shortened to accommodate succeeding layers or tiers of cotton bales to be loaded. The sling can be shortened or lengthened in a similar manner in unloading.

It will be appreciated that the improved power hoist is of simple and sturdy design. It is very fast in operation, facilitating loading and unloading. While the construction has been primarily designed for use on trucks, such as are adapted to carry cotton bales, it will be appreciated that it may be employed wherever there is occasion to raise and shift heavy loads. The improved construction is advantageous in that the power applied to the cable 12 is used not only to raise and lower the load onto and off of the boom, but is also utilized to pull the carriage or travelling block inwardly on the boom to the desired location. Outward movements of the carriage or travelling block are accomplished by allowing the travelling block to merely roll down the inclined boom toward its outer end until such movement is arrested by the cable.

Various changes may be made in the details

of construction without departing from the spirit or scope of the invention as defined by appended claims.

I claim:

1. A device of the class described comprising an extensible mast, a boom mounted thereon adjacent its upper end, a block movable along the length of the boom, a pulley on the block, means for supporting the pulley on the boom so that the block may be suspended therefrom, and a cable extending up the mast around the block and around said pulley and anchored to the block adapted to lift the block to the boom and then pull the block and pulley inwardly thereon.
2. A device of the class described comprising an extensible mast, a boom mounted thereon adjacent its upper end, a block movable along the length of the boom, a pulley on the block, means for supporting the pulley on the boom so that the block may be suspended therefrom, a cable extending up the mast around the block and around said pulley and anchored to the block adapted to lift the block to the boom and then pull the block and pulley inwardly thereon, and means for arresting the inward movement of the block on the boom.
3. A device of the class described comprising an extensible mast, a boom mounted thereon adjacent its upper end, a block movable along the length of the boom, a pulley on the block, means for supporting the pulley on the boom so that the block may be suspended therefrom, a cable extending up the mast around the block and around said pulley and anchored to the block adapted to lift the block to the boom and then pull the block and pulley inwardly thereon, and means for arresting the inward movement of the block on the boom at various locations.
4. A device of the class described comprising an extensible mast a boom mounted thereon adjacent its upper end, a block movable along the length of the boom, a pulley on the block, means for supporting the pulley on the boom so that the block may be suspended therefrom, and a cable extending up the mast around the block and around said pulley and anchored to the block adapted to lift the block to the boom and then pull the block and pulley inwardly thereon, there being pulleys on the mast over which the cable is trained whereby tension on the cable may serve to elevate the mast.
5. A device of the class described comprising an extensible mast, a boom mounted thereon adjacent its upper end, a block movable along the length of the boom, a pulley on the block, means for supporting the pulley on the boom so that the block may be suspended therefrom, a cable extending up the mast around the block and around said pulley and anchored to the block adapted to lift the block to the boom and then pull the block and pulley inwardly thereon, there being pulleys on the mast over which the cable is trained whereby tension on the cable may serve to elevate the mast, and means for locking the mast in extended position.
6. A device of the class described comprising an extensible mast, a boom mounted thereon adjacent its upper end, a block movable along the length of the boom, a pulley on the block, means for supporting the pulley on the boom so that the block may be suspended therefrom, a cable extending up the mast around the block and around said pulley and anchored to the block adapted to lift the block to the boom and then pull the block and pulley inwardly thereon,

there being pulleys on the mast over which the cable is trained whereby tension on the cable may serve to elevate the mast, and means for locking the mast in extended position, operable by the means serving to arrest inward movement of the block.

7. A device of the class described comprising an extensible mast, a downwardly and outwardly inclined boom mounted thereon adjacent its upper end, a block movable along the length of the boom, a pulley on the block, means for supporting the pulley on the boom so that the block may be suspended therefrom, and a cable extending up the mast around the block, around said pulley, and anchored to the block adapted to lift the block to the boom and then pull the block and pulley inwardly thereon, means on the boom for arresting inward movements of the block, and a latch on the block engageable with said means.

8. A device of the class described comprising an extensible mast, a boom mounted thereon, a block movable along the length of the boom, means for locking and unlocking the mast in extended position, and means operable by the block on the boom for operating the last-mentioned means.

9. A device of the class described comprising an extensible mast, said mast having an outer housing, an outer sleeve disposed therein, an inner sleeve in threaded engagement with the outer sleeve, a mast section slidably disposed within the inner sleeve, sheaves on the inner sleeve and mast section, a cable trained over the sheaves, a block, a boom on the mast along which the block is movable, said cable being connected to said block and serving when pulled to elevate the mast and pull the block inwardly on the boom.

10. A device of the class described comprising an extensible mast, said mast having an outer housing, an outer sleeve disposed therein, an inner sleeve in threaded engagement with the outer sleeve, a mast section slidably disposed within the inner sleeve, sheaves on the inner sleeve and mast section, a cable trained over the sheaves, a block, a boom on the mast along which the block is movable, said cable being connected to said block and serving when pulled to elevate the mast and pull the block inwardly on the boom, and means for rotating the outer sleeve.

11. A device of the class described comprising an extensible mast, said mast having an outer housing, an outer sleeve disposed therein, an inner sleeve in threaded engagement with the outer sleeve, a mast section slidably disposed within the inner sleeve, sheaves on the inner sleeve and mast section, a cable trained over the sheaves, a block, a boom on the mast along which the block is movable, said cable being connected to said block and serving when pulled to elevate the mast and pull the block inwardly on the boom, and means for rotating the outer sleeve, and means for locking the outer sleeve and inner sleeve together.

12. A device of the class described comprising an extensible mast, a boom thereon, a block on the boom, sheaves on the sections of the mast, a cable connected to the block and trained about the sheaves serving to pull the block inwardly on the boom and to elevate the mast, lockup bars on the mast, means engageable by the lockup bars to hold the mast in extended position, and means

engageable by the block for operating the lockup bars to either lock or unlock the mast against collapse.

13. A device of the class described comprising a mast, a boom mounted thereon adjacent its upper end, a block movable along the length of the boom, a pulley on the block, means for supporting the pulley on the boom so that the block may be suspended therefrom, and a cable extending up the mast outwardly along the boom around the block and said pulley and anchored to the block adapted to lift the block to the boom, and then pull the block and pulley inwardly thereon.

14. A device of the class described comprising a mast, a boom mounted thereon adjacent its upper end, a block movable along the length of the boom, a pulley on the block, means for supporting the pulley on the boom so that the block may be suspended therefrom, a cable extending up the mast outwardly along the boom around the block and said pulley and anchored to the block adapted to lift the block to the boom and then pull the block and pulley inwardly thereon, and means on the boom for arresting inward movements of the block on the boom.

15. A device of the class described comprising a mast, a boom mounted thereon adjacent its upper end, a block movable along the length of the boom, a pulley on the block, means for supporting the pulley on the boom so that the block may be suspended therefrom, a cable extending up the mast outwardly along the boom around the block and said pulley and anchored to the block adapted to lift the block to the boom, and then pull the block and pulley inwardly thereon, means on the boom for arresting inward movements of the block on the boom, and a latch on the block engageable with said means.

16. In a device of the class described, a boom, a block movable along the length of the boom, a pulley on the block, means for supporting the pulley on the boom adjacent the outer end thereof so that the block may be suspended therefrom, and a cable extending along the length of the mast around the block and around said pulley adapted to lift the block to the boom and then pull the block and pulley inwardly thereon.

17. In a device of the class described, a boom, a block movable along the length of the boom, a pulley on the block, means for supporting the pulley on the boom adjacent the outer end thereof so that the block may be suspended therefrom, a cable extending along the length of the mast around the block and around said pulley adapted to lift the block to the boom and then pull the block and pulley inwardly thereon, and means on the boom for arresting inward movements of the block.

18. In a device of the class described, a boom, a block movable along the length of the boom, a pulley on the block, means for supporting the pulley on the boom adjacent the outer end thereof so that the block may be suspended therefrom, a cable extending along the length of the mast around the block and around said pulley adapted to lift the block to the boom and then pull the block and pulley inwardly thereon, means on the boom for arresting inward movements of the block, and a latch on the block engageable with said means.

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