212 TRAVERSING HOISTS.

Draftsman.

No. 850,757. PATENTED APR. 16, 1907.

W. E. HUTCHINGS.

HOIST.

APPLICATION FILED OCT. 29, 1906.

3 SHEETS—SHEET 1.

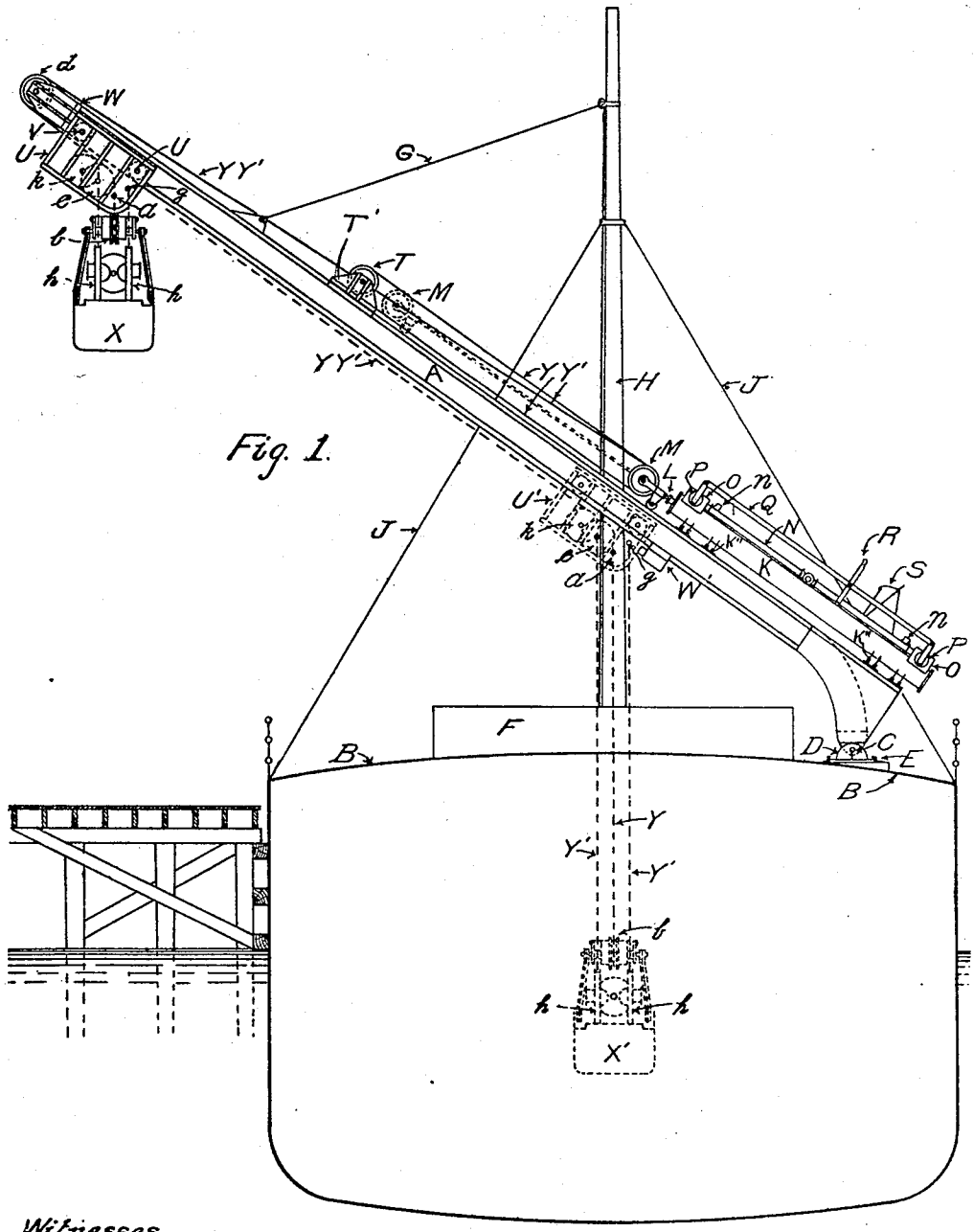


Fig. 1.

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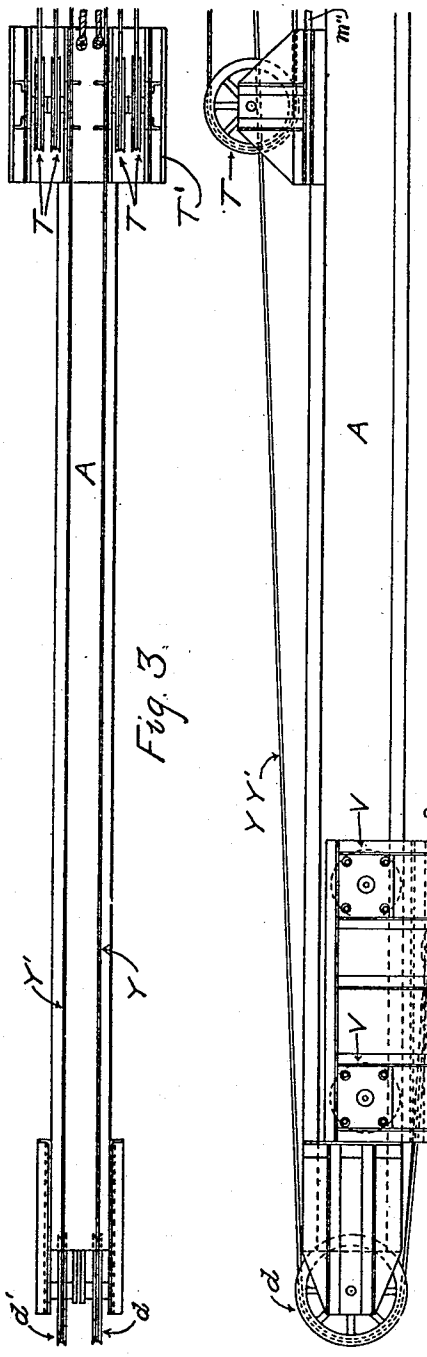


Fig. 3.

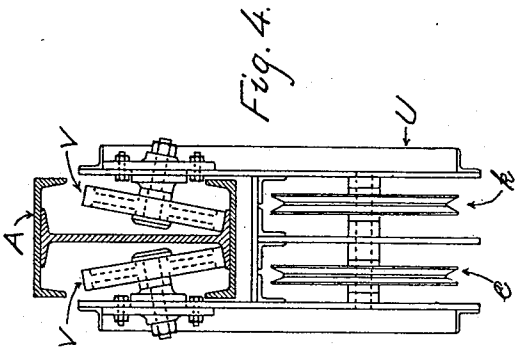


Fig. 4.

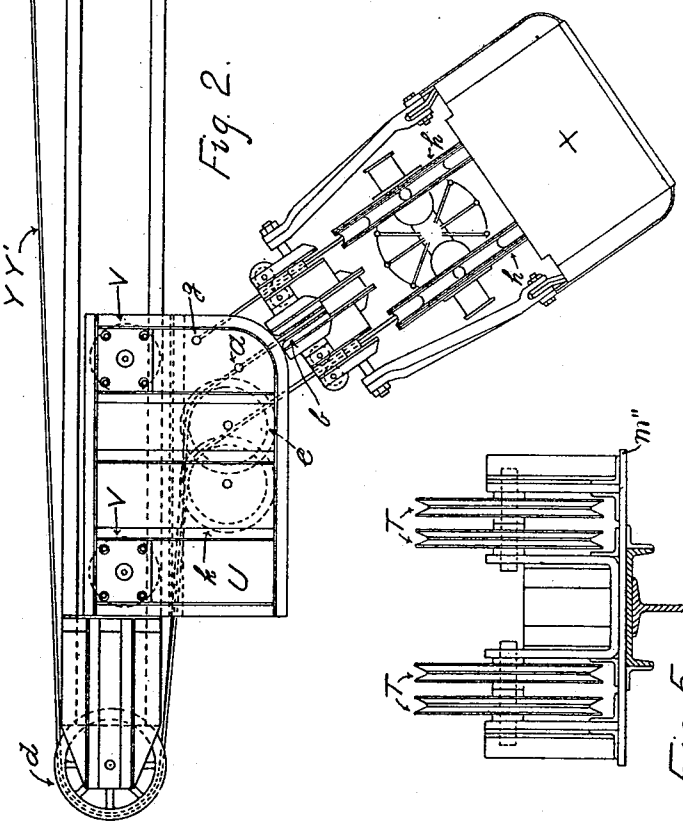


Fig. 2.

Fig. 5.

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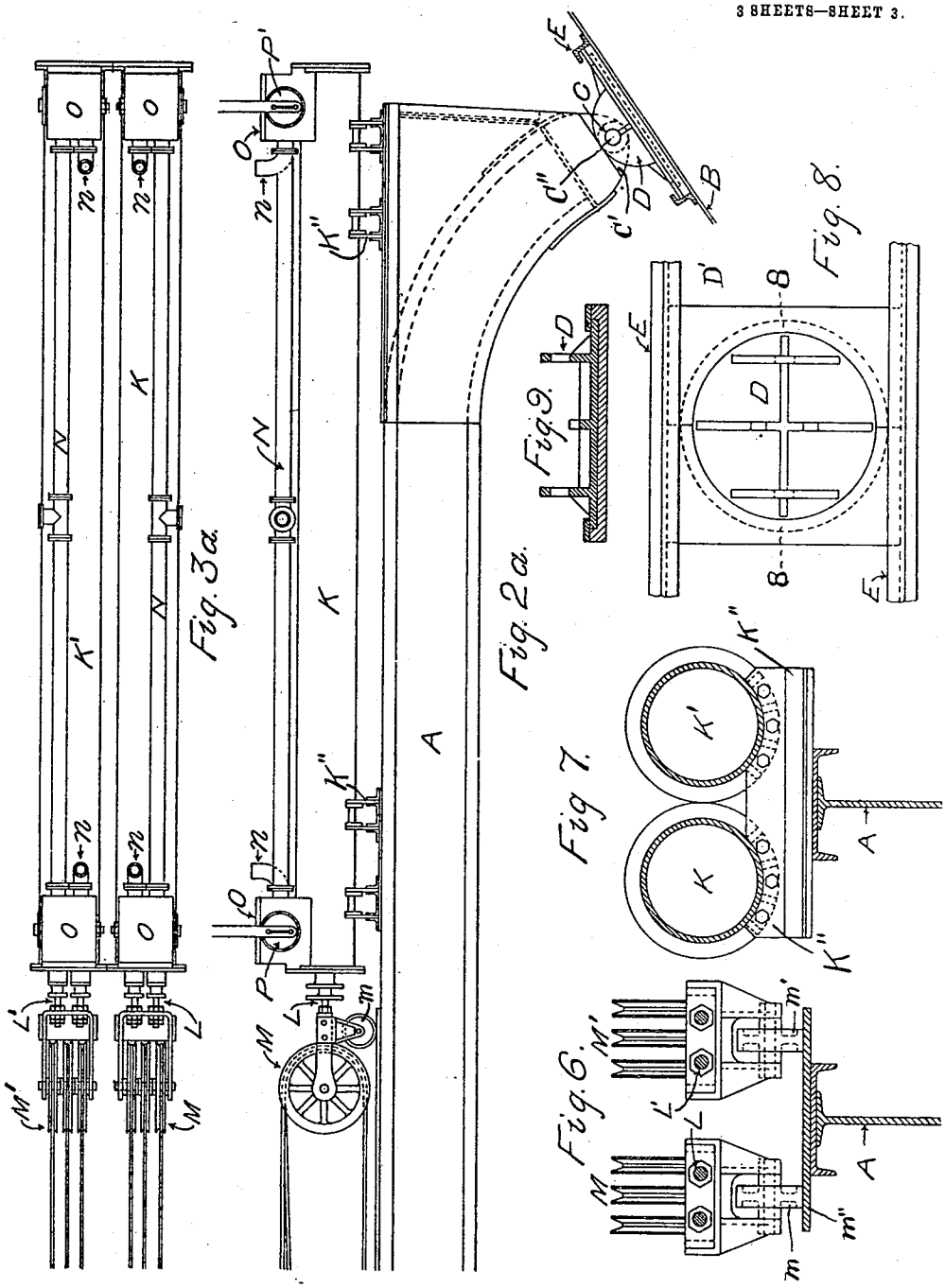
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UNITED STATES PATENT OFFICE.

WILLIAM E. HUTCHINGS, OF LOUISVILLE, KENTUCKY.

HOIST.

No. 850,757. Specification of Letters Patent. Patented April 16, 1907.

Application filed October 29, 1906. Serial No. 341,162.

To all whom it may concern:

Be it known that I, WILLIAM E. HUTCHINGS, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Hoists; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to mechanism for loading and unloading ships, and is more particularly directed toward that class of mechanism used in loading and unloading ships containing matter in bulk, such as coal, ore, and similar material.

The object in view is the provision of mechanism that is adjustably positioned upon a ship for loading and unloading the same.

With these and other objects in view the invention comprises certain novel constructions, combinations, and arrangements of parts, as will be hereinafter more fully described and claimed.

In the drawings, Figure 1 is a side elevation of a mechanism embodying the features of the present invention shown as positioned on a ship. Fig. 2 is an enlarged detail view, in side elevation, of the outer end of a boom and mechanism carried thereby forming a part of the present invention. Fig. 2ª is an enlarged detail view, in side elevation, of the inner end of the boom and mechanism forming a part of the present invention. Fig. 3 is an enlarged detail top plan view of a series of sheaves forming a part of the present invention. Fig. 3ª is an enlarged detail plan view of a plurality of cylinders and sheaves positioned adjacent thereto forming a part of the present invention. Fig. 4 is a section taken through the outer end of the boom forming a part of the present invention, together with a movable carriage that is adapted to move on said boom. Fig. 5 is a sectional view of part of the boom forming a part of the present invention and showing in connection therewith a plurality of sheaves. Fig. 6 is a sectional view of part of the boom and movable sheaves mounted thereon forming a part of the present invention. Fig. 7 is a sectional view through a pair of cylinders forming a part of the present invention and means for securing the same in place. Fig. 8 is a top plan view of a turn-table or pivot-deck shoe forming a part of the present invention. Fig. 9 is a section through Fig. 8 on line 8 8.

Referring more particularly to the drawings, A is a boom or trolley-track, preferably formed of an I-beam and channel-beams positioned on the top and bottom of the same, as clearly shown in Fig. 4 of the drawings.

Referring more particularly to Fig. 4 of the drawings, it will be seen that the boom A is of an I-beam, built-up, or channel design. The channel-beams are shown with their flanges facing each other, and consequently forming an inclosure; but this is not necessary, as they may be faced outward, if desirable, the channel-beams being used as a lateral stiffening means or flange-reinforcement for the I-beam. The trolley-wheels V V are arranged to operate upon the flanges of the I-beams and preferably astride of the same, as clearly seen in Fig. 4, for supporting a carriage U, which will be described more fully hereinafter. The boom is pivotally secured at C to a turn-table or pivotally-mounted deck-shoe D. Projections C′ are secured to the boom A and have mounted therein a shaft C″ for supporting the boom A in the turn-table D. The turn-table D is mounted in a housing D′, as clearly seen in Figs. 2ª and 8. The housing D′ is positioned between suitable rails E E and is adapted to reciprocate therein for allowing the position of the pivoted or lower end of the boom A to be changed as may be desired. The rails E E preferably extend the full length of the ship upon which the present invention is used, so as to permit the boom A to be operated from any place on the ship. The boom A in operation is raised by a guy-rope G, which is passed through a suitable pulley upon the mast H for raising and holding the same in an inclined position, as clearly seen in Fig. 1 of the drawings. The mast H is generally only supported by the usual standing rigging or shrouds J; but in case extremely heavy articles are desired to be loaded or unloaded the mast H may be suitably supported by other guy-ropes, as may be desired.

As seen in Fig. 1 of the drawings, the boom A is positioned at an inclination of approximately forty-five degrees; but it will be evident that by operation of the guy-rope G the outer end of the boom A will be raised or lowered, as may be desired, for accommodating various circumstances as the same may

arise. The lower end of the boom A is mounted in the sliding turn-table D, so that the lower end may be reciprocated for positioning the same at any place along the ship, so as to permit the boom A to be positioned at any point for readily and conveniently permitting the operation of the bucket X, to be described more fully hereinafter. Secured to the lower or pivoted end of the boom A is a plurality of cylinders, as K and K′, which are adapted to be operated by any convenient fluid, as steam or compressed air. The cylinders K and K′ are firmly held in position by suitable supports and securing means K″ K″, as clearly seen in Figs. 1, 2ª, and 7. The operating fluid is adapted to be admitted to either end of the cylinders K and K′ through the pipes N and the valve-chests O. The operating fluid is exhausted from either end of the cylinders through the valve-chest O and exhaust-pipe *n*. Suitable valves P P′ are positioned in the valve-chests O O and are adapted to be controlled through the connecting-rod Q and the hand-lever R.

As will be clearly seen from Fig. 1 of the drawings, an operator sitting upon the seat S may operate the levers R as may be desired for admitting or exhausting operating fluid into or from either end of the cylinders as occasion may require. Positioned within the cylinders K and K′ are a plurality of piston-rods L and L′ for operating movable sheaves M and M′. Secured to the frame that holds the sheaves M and M′ are bearing wheels or casters *m* and *m′*, which are adapted to contact with a bearing-plate *m″*, that is rigidly secured to the boom A and extends from the cylinders K and K′ to any convenient distance toward the outer end of the boom A, preferably to the fixed sheaves T T. At the outer end of the bearing-plate *m″* is secured a framework T′, upon which are mounted a plurality of pulleys or sheaves T T. Positioned on the extreme outer end are a pair of pulleys or sheaves *d* and *d′*, which are adapted to be postioned in line with the inner pulleys or sheaves M and M′, so as to permit a rope passing over the inner sheaves M and M′ to also pass over the pulleys *d* and *d′*. As will be evident, cables Y and Y′ are secured to either the framework, upon which the sheaves M and M′ are mounted, or upon the framework T′ and then passed around the pulleys or sheaves T and the outer sheaves M and M′, and finally around the inner sheaves M and M′ and from thence over the sheaves *d* and *d′* to the carriage U. Mounted upon the boom A is a carriage U, that is adapted to freely travel back and forth upon the boom. The carriage U is formed with side plates and reinforcing-irons, forming a stiff strong carriage for sustaining the weight of heavy articles without bending or effecting the same as it operates. Mounted within the upper part of the carriage U are a plurality of pairs of wheels V V, which operate at a slight angle to a perpendicular, as clearly seen in Fig. 4 of the drawings. This is arranged so as to permit the periphery of the wheels V V to squarely rest against the flanges of the I-beam which is used in making up the boom A. The channel-iron, which is secured to the I-beam, is shown with its flanges facing inward or toward the opposite side of the I-beam and forms a flange-reinforcing strip for stiffening the I-beam. Either one or both of the channel-irons may be faced the other way, if desirable. Positioned below the wheels V V is a pair of pulleys or sheaves *c* and *k*, over which the cables Y and Y′ are adapted to pass. The cables Y and Y′ pass over the pulleys or sheaves *c* and *k* and thence around suitable sheaves in a bucket X and back to the carriage U and are there secured in place. By this means the bucket X is operated and held in place as may be desired. The line or cable Y, known as the "holding-line," is attached to the trolley wagon or carriage U at *a*, passes thence around a sheave *b* at the head of the bucket X, thence upward and over the sheave *c* in the carriage U, thence over the sheave *d* at the outer end of the boom A, thence successively a requisite number of times over the sheaves M and T, and be finally fastened to the base-frame T or the movable frame of the sheave M. The other line or cable Y′, known as the "closing-line," is attached to the carriage U at *g*, passes from thence over the various sheaves of the closing mechanism *h* of the bucket X up over a sheave *k*, through the carriage U, thence over the sheave *d′* at the outer end of the boom A, from thence successively over one of the pairs of sheaves T T and the sheaves M′, and finally fastened to the frame T′ or the frame of the sheaves M′.

In operation the carriage U and bucket X being positioned at the outer end of the boom A, as shown in full lines in Fig. 1, the bucket is held closed by the closing-line Y′ and is held in proximity to the carriage U by the holding-line Y. The carriage U is held at the outer end of the boom A against a stop W of any desired construction. This prevents the accidental displacement of the carriage U by pulling the same off at the outer end. Positioned at any convenient point, preferably over the center of the vessel, is another stop W′, which is adjustable in respect to the boom A and may be positioned at any point along the boom A, so as to limit the downward movement of the carriage U. As shown in the drawings, the stop W′ is so positioned as to stop the carriage U in such position as to permit the bucket X to be lowered in the center of the vessel; but it will be evident that in case the bucket X is desired to be lowered to one side the stop W′ may be moved in either direction to stop the movement of the carriage U before it reaches the

center of the vessel or after it has passed the same. When it is desired to move the carriage U from its outer position, (shown in full lines in Fig. 1,) the operator at S moves both of the levers R, and consequently operates the valves P P for permitting fluid to exhaust from one end of the cylinders K and permit the fluid to enter into the other end, thus forcing the sheaves M and M′ outward, and consequently giving slack to the lines Y Y′, which will in turn permit the carriage U to travel downwardly upon the boom A by gravity. By thus exhausting pressure from one end and permitting pressure to enter the other the speed of the sheaves M and M′ may be easily regulated and controlled for slowly or rapidly moving the carriage U. After the carriage U has descended until it has come in contact with the stop W′, as seen at U′ in dotted lines in Fig. 1, the cables Y Y′ will be permitted to pay out or be given slack by the continued outward movement of the sheaves M and M′, and consequently the bucket X will descend by gravity to the position shown in dotted lines at X′ and will be automatically filled by the opening and closing of the bucket in the usual manner of self-loading buckets. As the sheaves M and M′ are moved outward for lowering the carriage U and bucket X they are moved at the same rate until the bucket X has reached the position shown in dotted lines at X′ in Fig. 1. As the sheaves M and M′ moves outward the carriage U is permitted to descend until it engages the stop W′. The carriage will remain in this position. As the sheaves M and M′ continue to move outward the bucket X will be lowered, as above described, to the position shown in dotted lines, as X′. (See Fig. 1.) After the bucket has been lowered to the position X′ the closing-line Y′ is permitted to pay out slightly by further movement of the sheave M′, which will cause the bucket X to open in the usual manner of automatic-acting buckets. After the bucket has been lowered into the hold of the vessel and opened, as just described, it will upon the retraction of the sheave M′ a short distance close and in closing fill itself with the material in the vessel to be removed. After the bucket has thus been filled and closed both sheaves M and M′ are moved at the same rate toward the cylinders K and K′, respectively, until the bucket has reached its position at the outer end of the boom A, as clearly seen in Fig. 1 of the drawings. As the bucket X is elevated from the hold of the vessel it will first engage the carriage U and, impinging against the same, cause the carriage U to travel upward by the continued retraction of the cables Y and Y′ until the carriage U, with the bucket X, is in its outermost position on the boom A. After the carriage U has been brought to its outermost position against the stop W the bucket X is in position for dumping or for being lowered, as may be desirable. The sheaves M′ may then be forced outwardly a short distance, which will permit the bucket X to open and material contained therein to drop by gravity, or, if desired, a catch may be placed at the stop W and the bucket X lowered to any distance that may be desired and then dumped in the usual manner.

From the particular arrangement and location of the carriage, bucket, boom, and operating means a reasonably compact and readily-operated mechanism is provided for unloading vessels and the like with as little labor and inconvenience as possible and with the greatest possible speed obtainable. The arrangement of the track the full length of the vessel and a sliding turn-table or pivot-plate, in combination with the supporting-boom and mechanism carried thereby, discloses a structure that is readily adapted to any-size vessel and for any condition of the same, as the boom and hoisting mechanism may be moved from place to place over the vessel in order to reach all points.

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

1. In a hoist for ships, the combination of a boom, a plurality of cylinders mounted on said boom, a carriage mounted on said boom and adapted to reciprocate thereon, means for supporting a bucket from said carriage, means for supporting said carriage, means for opening and closing said bucket, means connected to one of said cylinders for operating said bucket-supporting means, means connected to the other of said cylinders for operating said bucket opening and closing means, and means for permitting the boom and mechanism carried thereby to be moved the entire length of said ship.

2. In a hoist for ships, the combination of a pivotally-mounted boom, cylinders mounted on said boom, a plurality of sheaves operated by said cylinders, a plurality of sheaves secured to said boom, a plurality of cables passing over said sheaves for supporting a bucket, a reciprocating carriage mounted on said boom for regulating the movement of said bucket, means secured to said cylinders for regulating the operation thereof, means for moving said boom pivotally, and means for permitting said boom to be moved longitudinally of said ship.

3. In a hoist for ships, the combination with a boom of hoisting mechanism and means for operating the same mounted thereon, a pivotally-mounted bearing for said boom, a sliding plate upon which said bearing is positioned and a plurality of guideways extending the entire length of the ship for guiding the movement of said plate and pivotal bearing and for permitting said

boom and mechanism and means for operating said mechanism carried thereby to operate at any point upon said ship.

4. In a hoist, the combination of a hoisting mechanism, a boom for supporting said hoisting mechanism, cylinders mounted on said boom, movable sheaves operated by said cylinders, said sheaves being supported by antifriction means, and a plate secured to said boom for forming a bearing for said antifriction means.

5. In a hoist, the combination with a pivotally-mounted boom, a plurality of cylinders mounted on said boom, a carriage and bucket, a plurality of cables operated by said cylinders for operating said carriage and bucket, and a plurality of stops positioned upon said boom for regulating the movement of said carriage and bucket.

6. In a hoist for ships, the combination with a boom, of a carriage and bucket mounted on said boom, cables secured to said carriage and bucket for operating the same, a plurality of independent cylinders and operating mechanism mounted on the lower end of said boom, a plurality of sheaves engaging said cables for independently operating said carriage and said bucket, means for limiting the movement of said carriage, and means for varying the position of said boom on said ship, the mounting of the operating means on the boom permitting the movement of the boom without affecting the operation of the mechanism mounted thereon.

7. In a hoist for ships, the combination of a hoisting mechanism, a boom for supporting said hoisting mechanism, a cylinder mounted on said boom, movable sheaves carried by said cylinder and antifriction means for guiding the movement of said sheaves.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM E. HUTCHINGS.

Witnesses:

SAM. HUTCHINGS,

JOHN BACON HUTCHINGS.