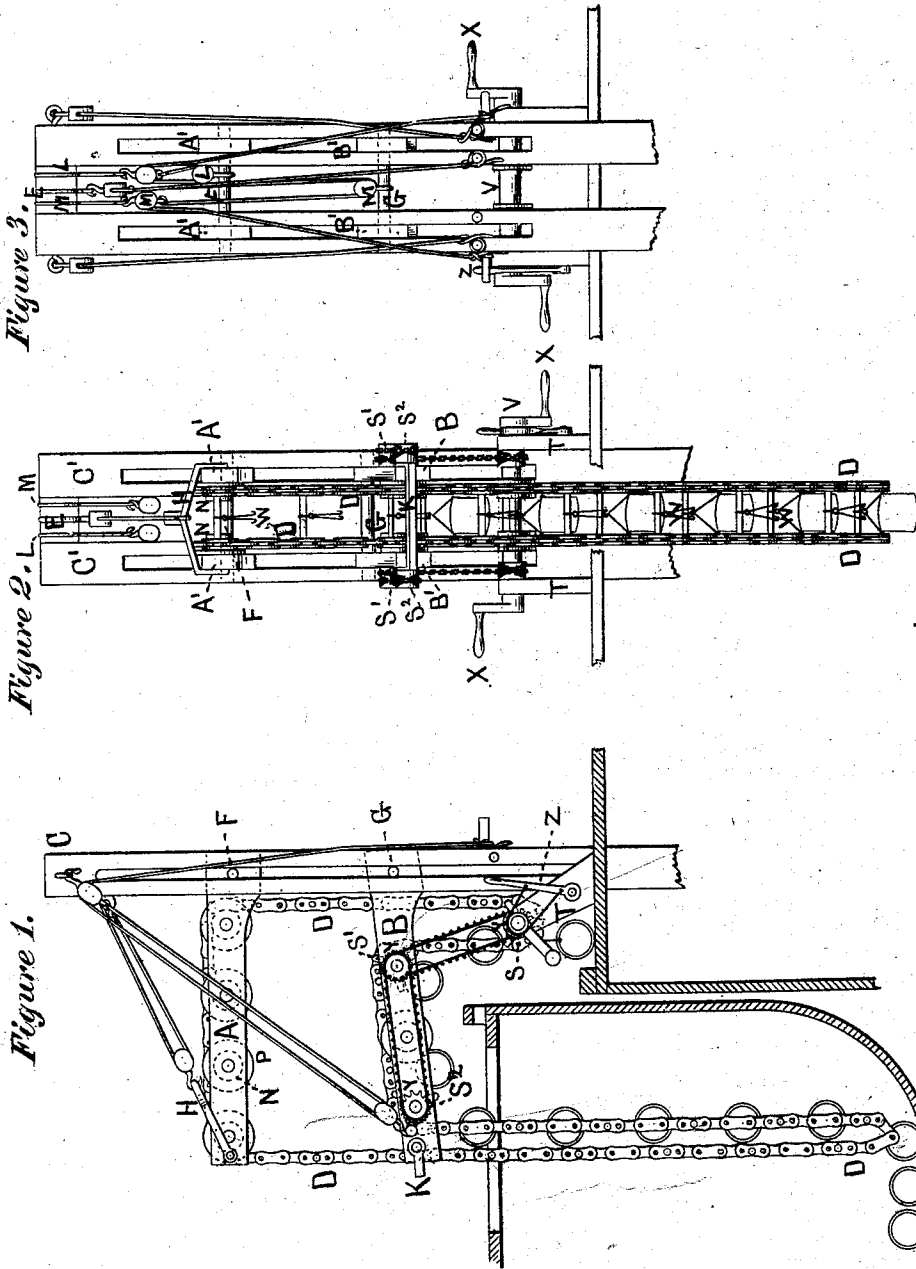


J. W. ALEXANDER.
Crane for Loading Vessels.

No. 224,505.

Patented Feb. 17, 1880.



Witnesses:
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Inventor:
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UNITED STATES PATENT OFFICE.

JOHN W. ALEXANDER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF OF HIS
RIGHT TO A. J. POUCH, OF SAME PLACE.

CRANE FOR LOADING VESSELS.

SPECIFICATION forming part of Letters Patent No. 224,505, dated February 17, 1880.

Application filed January 15, 1880.

To all whom it may concern:

Be it known that I, JOHN W. ALEXANDER, of the city, county, and State of New York, have invented a new and useful Improvement in Cranes for Loading and Unloading Vessels, of which the following is a specification.

The invention relates to cranes or derricks for elevating and transferring barrels, boxes, &c., from one level to another.

It consists in the combination, with adjustable and movable arms supported and swung from a suitable derrick-post, of an endless carrying-chain arranged to travel upon said arms and to depend from their inner ends to the foot of the derrick-post and from their outer ends down to the desired level of delivery.

The object of my invention is to utilize the weight of the packages lowered at one end of the crane in lifting the packages elevated upon the chain at the other, so that where the packages are to be delivered at a lower level than that from which they are lifted the operation of transferring them may be accomplished automatically by their own weight, and otherwise, where the level of delivery is the highest, the transfer will require but little more power than is needed to lift the packages from the loading to the unloading level, the lift to an additional height for facility of transfer being compensated by the corresponding fall.

In the accompanying drawings, Figure 1 is a side elevation of my improved crane when employed in loading a vessel with barrels from a wharf, Fig. 2 being a front, and Fig. 3 a rear elevation of the same.

Similar letters refer to similar parts throughout the several views.

In its general features my improved crane is constructed of upper and lower arms, A and B, swung from a derrick-post, C, and adjustable thereon, and each of which is made double to support properly a pair of connected endless chains, D D, Fig. 2.

The derrick-post C may be made single, and the arms be swung thereon by means of collars or bands; or it may be made double, as shown in Figs. 2 and 3, to provide for a separate support for the inner end of each of the arms.

In the form of construction illustrated in the accompanying drawings the parallel up-

rights C' C' of the derrick-post are firmly stepped and secured in a suitable base-block, and connected at the top by a transverse bar, E.

The interval between the uprights is preferably left sufficiently wide to admit of the passage of a barrel lengthwise between them. These uprights of the derrick-post are slotted longitudinally in one direction to receive and confine the inner ends of the beams A' A' and B' B' of the arms A and B, and in the other to receive the ends of rods F and G, Figs. 2 and 3, passing through the inner ends of said beams to connect them in pairs, the outer ends of each pair being connected and coupled by transverse bars or rods H K.

The inner ends of the connected beams A' A', forming the upper arm of the crane, are upheld and adjusted, as required, upon the post by means of a fall and tackle, L, (see Fig. 3,) suspended from the upper transverse bar, E, of the post, and which engage the transverse connecting-rod F. The inner ends of the connected beams B' B', forming the lower arm of the crane, are upheld and adjusted in like manner by means of a fall and tackle, M, suspended from the upper bar, E. The outer ends of the upper and lower arms, A and B, are, in like manner, each supported and adjusted by means of a fall and tackle extending to the outer connecting-bars, H and K, from eyes or staples on the outer side of the derrick-post at its upper end, as shown in Figs. 1 and 3.

Upon the inner side of each beam of the upper and lower arms, A B, a series of friction-rollers, N N, are pivoted, the inner end of each roller being formed with a wide flange, P. The upper arm, A, is fitted with these rollers from end to end; but on the lower arm, B, one set of the rollers is omitted at its outer end and two or more at its inner end, as shown in Fig. 1.

A double endless chain consisting of two chains, D D, (see Fig. 2,) connected at regular intervals by transverse rods, is carried over the rollers N. The transverse rods are of such length as to keep the two chains separated by an interval corresponding with that between the beams A' A' and B' B' of the arms, so that the chains shall each rest, respectively, upon

the friction-rollers on either side when led along the arms. Each rod connecting the chains D D may be covered by a loose sleeve, consisting of a tube fitted thereon to serve as a roller, so that the rods shall pass easily over any obstacle in the path thereof, and to facilitate, likewise, the self-adjustment of the lifting-hooks depending therefrom.

A pair of sprocket-wheels, S S, are fitted upon a shaft, V, which is suitably supported upon brackets T T at the foot of the derrick, to engage the chain at this point, the shaft V being fitted with cranks X X at each end to operate the same.

A second pair of sprocket-wheels, S' S', are substituted for friction-rollers, to receive and engage the chain at the inner end of the lower arm, B, and a third pair, S² S², are substituted for friction-rollers at the outer end of said arm. These sprocket-wheels S' S² on the arm B of the derrick are made to move in unison with those upon the crank-shaft V by means of chain-gearing on each side of the arm, actuated by suitable toothed wheels Y Y, fixed on the shaft and upon the arbor of each sprocket-wheel S' S², the arbor being made to project for the purpose from the inner to the outer side of the beams of the arm.

The double endless chain D D is led over the friction-rollers N upon the upper arm, A; thence dropping, at the inner end of said arm, to the sprocket-wheels S S at the foot of the derrick-post, is led under the same, and back up over the sprocket-wheels S' S' and friction-rollers upon the lower arm, B, and out over the same to the sprocket-wheels S² S² at the end of said arm, and, passing over these wheels, is allowed to drop far enough to reach the lowest level of delivery to which the crane is to be directed, and then carried up to the rollers of the upper arm, as shown in Fig. 1.

Lifting tongs or hooks W W are suspended to swing free from the center of each transverse rod of the endless chain D D.

In the operation of this apparatus for lifting and transferring barrels or other parcels from a wharf to the hold of a vessel, the derrick-post C is firmly secured at its base upon the wharf, so that its arms A B may swing over the deck of the vessel to its hatchway, and the arms are properly adjusted in height by means of the fall and tackle L and M provided for the purpose.

The lower arm, B, is fixed at such a height that the barrels carried out thereon shall clear the bulwark of the vessel, and the upper arm is elevated sufficiently to take up the slack of the chain D D remaining after the chain has been dropped to the proper level in the hold.

The barrels are rolled under the sprocket-wheels S S at the foot of the derrick, and caught in succession by the lifting-hooks W depending from the chain.

At the start the chain is put in motion by

the cranks X X operating the shaft V, its sprocket-wheels S S, and the connected wheels S' and S², to lift and carry forward the barrels loaded upon the chain at the foot of the derrick; but so soon as the barrels passing beyond the outer end of the lower arm begin to drop into the hold, their weight, counterbalancing and overbalancing the weight of the barrels lifted at the inner end of the arm, will hoist the same as fast as caught by the hooks W of the chain, and carry them out to the end of the arm, so that the movements of the chain in lifting and transferring the barrels from the wharf to the hold will become automatic, the only power required to effect the same being that expended at the start. The too rapid movement of the chain is governed by means of a friction-brake, Z, applied to the sprocket-wheel shaft V, as shown in Fig. 1.

I claim as my invention—

1. The combination of adjustable and movable arms supported and swinging from a derrick-post with an endless carrying-chain traveling upon said arms, adapted to drop from their inner ends to the foot of the derrick-post and from their outer ends to the point of delivery, so that the weight of packages lowered by the chain shall facilitate the elevation of packages hoisted thereby.

2. The combination of connected endless chains D D with independent friction-rollers upon the inner face of each beam of the adjustable arms A B of a crane, to permit the free passage of articles suspended from the connecting-bars of the chain between said beams and rollers, substantially as herein described.

3. The combination of the independent sprocket-wheels S' S² upon the inner side of each beam B' B' in the double arm B of a crane with toothed wheels and chain-gearing connecting the same upon the outer side of each beam, substantially as described.

4. The combination, with the sprocket-wheels S' S² upon the lower arm of a crane, the chain-gearing connecting the same, and the endless chain actuated thereby, of sprocket-wheels S S upon the crank-shaft at the foot of the crane, substantially as and for the purpose set forth.

5. The derrick-post C, provided with adjustable and movable arms A B, brackets T T, shaft V, cranks X X, and sprocket-wheels S S' S², in combination with the endless chain D D and friction-rollers N N, all adapted, substantially as described, for facilitating the automatic elevation of packages to be hoisted by the weight of those which are being lowered.

Witness my hand to said specification this 10th day of January, 1880.

JNO. W. ALEXANDER.

Witnesses:

DAVID A. BURR,
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