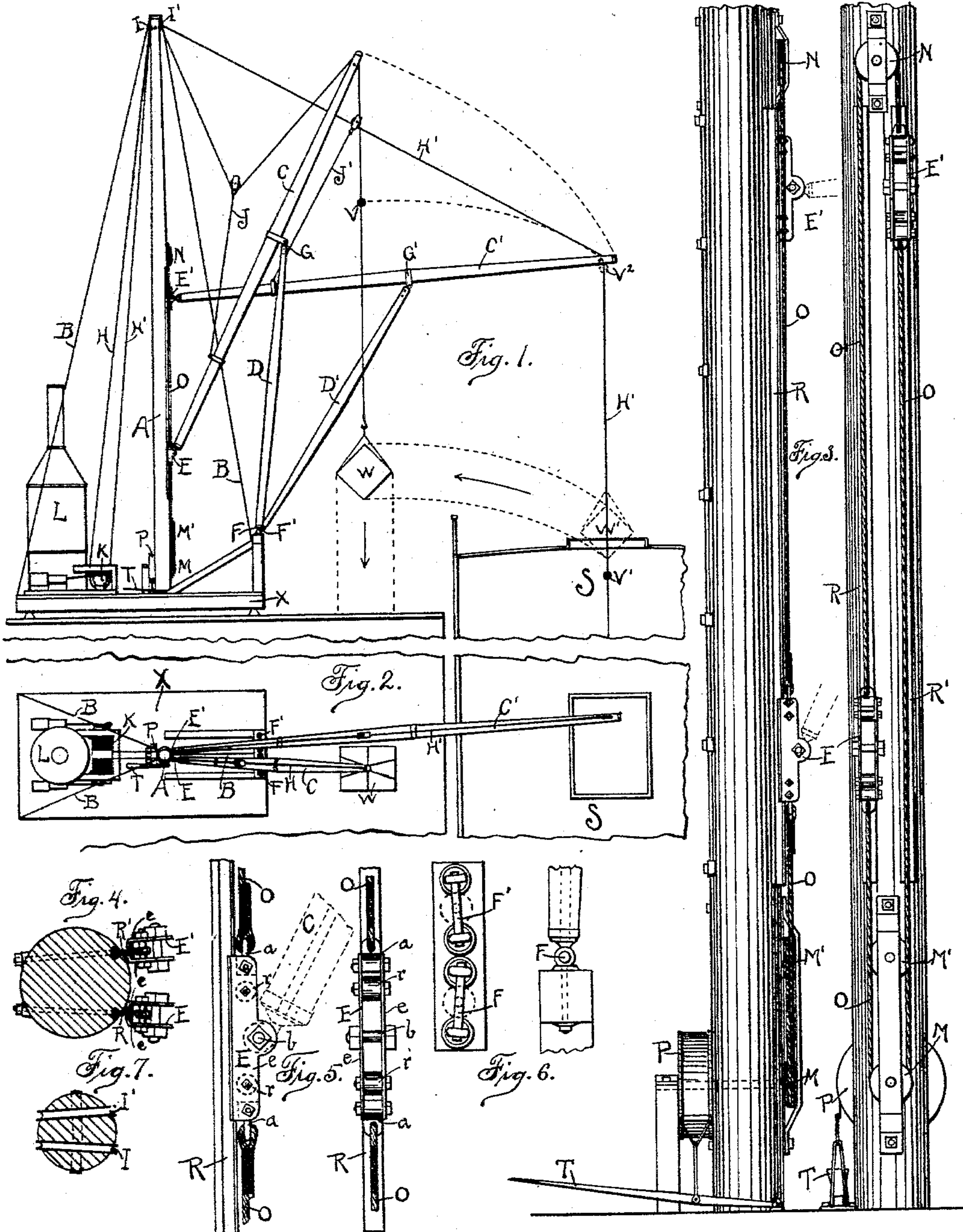


(No Model.)

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DERRICK CRANE.

No. 584,187.

Patented June 8, 1897.



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## DERRICK-CRANE.

SPECIFICATION forming part of Letters Patent No. 584,187, dated June 8, 1897.

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*To all whom it may concern:*

Be it known that we, WILLIAM L. McCABE and CHARLES H. ANDERSON, citizens of the United States, residing at Tacoma, county of Pierce, and State of Washington, have invented certain new and useful Improvements in Derrick-Cranes, of which the following is a concise, clear, and full description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to hoisting derrick-cranes and is designed, preferably, for the loading and unloading of freight to and from ships and other water craft, and has for its object the more direct and rapid movement of freight from the hold to the wharf, and vice versa, than by the more common method of using a gaff constructed in the rigging of the ship or vessel being loaded or unloaded. It is also to be used in moving stone in quarries, merchandise, or freight of any kind on and off cars or other conveyances wherever the services of a derrick-crane may be required. We attain these objects by means of the apparatus illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the derrick-crane in operation unloading a vessel, and Fig. 2 is a top view of the same. Fig. 3 is an enlarged front and side view of a part of the mast of the derrick-crane, showing the sliding shoes in which the lower ends of the gaffs are pivoted. Fig. 4 is a more enlarged cross-section of the mast to show the metal slides on which the shoes work. Fig. 5 is a side and front view of the metal slide and shoe. Fig. 6 is a top and side view of foot-pivots of the boom on which the gaffs are supported. Fig. 7 is a section at the top of the main post, showing the pulleys over which the hoisting-ropes are worked.

The derrick-crane is constructed with a main upright stationary mast A, having two gaffs C and C'. These gaffs are attached to A with sliding shoes E E', to which they are pivoted, and are supported near the centers at G G' by booms D D', each of which is firmly pivoted at F, (more clearly shown at F F', Fig. 6.) The pivots are set at a sufficient angle to cause the gaffs to spread slightly and thus work freely of each other and yet have the

outer ends close enough together to work directly over a single hatchway of the ship, as seen in Fig. 2. The shoes E E' are attached to a rope belt O, run on the pulleys M and N and a third pulley M', which is used to enable the belt to have a double wrap around M to secure greater friction. Pulley M is provided with a friction or brake wheel P, with a foot-lever T, all of which enables the operator to hold E and E' at any position and thus stop C and C' at any point desired. Each gaff has a hoisting-rope H H', operated by the driving-drums K of the hoisting-engine L. The ropes H and H' are wound on opposite sides of drum K, so that as one is drawn in the other is let out. The ropes pass over the pulleys I I' and the pulleys of each gaff, as shown in Fig. 1, the lower ends of the gaff being provided with a rope and pulley J J', which act as a counterpoise to prevent too great a downward pressure on the shoes E and E' when the gaffs are in the position shown at C.

The adjustable cast-iron balls V and V' are placed on the ropes H and H' to make them move freely through the pulleys of the derrick when no load is on them. They also serve to start the gaffs to swing inwardly when a load is hoisted to the proper height, as shown by the position indicated at V<sup>2</sup> and W', Fig. 1. By adjusting these balls the inward movement of the gaffs may be determined as the rope is wound upon the drum.

The sliding shoes E E' are fitted to a metal slide, preferably of railroad track-iron, as shown at R R', Figs. 4 and 5, the head of the iron being sunk into the body of the mast and firmly bolted in place. The shoes are made of two rolled iron slide-pieces e e, with their rear edges bent to fit the flanges of the railroad-iron. They are bolted together through the cast eyelet-lugs a a, so as to fit properly and slide loosely on the iron. The small rollers r r are bolted in between the side pieces to run on the bottom of the iron rail and prevent friction. The pivot-eye of the gaff is fitted to the pivot-bolt b, as indicated in Fig. 5, and the rope or chain belt O is fastened to the lugs a a, as shown.

It will be observed that the entire derrick-crane rests on a movable platform X and the upright mast A is held in place by means of



the guy-ropes B B B. The hoisting-engine L is placed on the platform in such a position as to counterbalance any load put on the derrick-gaffs.

5 A vessel, as S, being moored at the wharf for unloading, the derrick is put in a position to work over a hatchway, and the ropes H H' are adjusted to the depth of the hold and it is ready for work.

10 The parts as illustrated in Fig. 1 are arranged for unloading a ship. A load being placed upon the rope H' in the position shown the drum K is operated to wind up the rope H', while the rope H is unwound from the drum. The ball V' is so adjusted that when  
15 the load reaches the position indicated at W' the ball V' comes in contact with a portion of the gaff C', as indicated at V<sup>2</sup>, and starts it to swing inwardly, while by the movement of  
20 the inner end of the gaff C' the gaff C is started to swing outwardly. As soon as the gaffs have moved a short distance the drum K is stopped and locked, and the gaffs continue to move automatically until the gaff C swings  
25 out over the hatchway and the gaff C' swings inwardly, bringing the load along the path indicated by the dotted lines to the position shown at W. Then the friction-wheel P is locked by means of the foot-lever T, thus  
30 stopping belt O and holding the gaffs whose ends are pivoted to the sliding shoes E and E' in a fixed position, as shown. The drum K is then started in a reverse motion and the load W is lowered to the wharf. The other  
35 gaff now over the hatchway is at once loaded and the operation again proceeds as above described. There will probably be some slack in the rope after the load is lowered to the wharf and after the load is detached, and as  
40 the gaff is swung outwardly over the hatchway of the vessel this slack rope may be drawn or passed over the side of the vessel and deposited through the hatchway to receive another load.

45 To load the vessel, the ropes J J' are adjusted to regulate the outward swing of the gaffs when loaded. The load is then raised from the wharf to the position W, when by releasing the friction-wheel P the gaff swings  
50 outwardly and the load swings over the hatchway, as shown at W', and is lowered into the ship. At the same time the other unloaded gaff is swinging inwardly and over the wharf into a position to be loaded.

55 Thus by means of the derrick-crane with two gaffs made to alternate automatically, as herein described, and controlled by one operator the work of unloading a vessel can be carried on very expeditiously.

60 In order to use the derrick-crane for loading a vessel, the ropes J J' are shortened, so as to properly adjust the ropes H H' for the outward movement of the freight, when the work of loading will proceed in practically  
65 the same manner as described for unloading, the gaffs being loaded for the outward instead of the inward swing. The ropes J J' are at-

tached to the gaffs by adjustable clamping-bands. By putting the attaching-bands nearer the pivots G and G' the inward swing  
70 of the gaffs is facilitated, and by moving them farther away from the pivots and nearer the shoes E E' the outward swing is secured.

It is to be observed that a derrick-crane with but one gaff can be constructed and operated the same as with two gaffs by means  
75 of the sliding shoe, governed by a friction-belt O, as above described. In fact one of the gaffs with its necessary rigging may be detached from the mast and the single remaining gaff will swing outward of its own  
80 weight after the load is deposited and the friction-wheel released. The single gaff may also be operated by moving the endless belt O by hand or otherwise.

85 It is to be further observed that it is necessary to raise the freight only a short distance above the deck of the ship, the ropes and gaffs being so adjusted that the load will be carried almost on a level as the gaffs swing in  
90 or out.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a derrick-crane, the combination with  
95 a mast, of an endless belt carried by pulleys mounted upon said mast, a pivoted gaff having its inner end secured to said belt, and means to actuate said gaff to cause its inner end to travel with said belt, substantially as  
100 described.

2. In a derrick-crane, the combination with  
a mast having a track or way thereon, of an endless belt supported by pulleys upon said  
105 mast, a shoe carried by said belt and traveling on said track or way, a pivoted gaff secured at its inner end to said shoe, and means to actuate said gaff to cause its inner end to travel with said belt, substantially as described.  
110

3. In a derrick-crane, the combination with  
a mast, of an endless belt supported by pulleys upon said mast, a pivoted gaff having its  
115 inner end secured to said belt, a supporting-boom on which said gaff is pivoted, and means to actuate said gaff to cause its inner end to travel with said belt, substantially as described.

4. In a derrick-crane, the combination, with  
120 a mast, of an endless belt supported by pulleys upon said mast, a pivoted gaff having its inner end secured to said belt, means to actuate said gaff to travel with the belt, and a brake mechanism to control the movement of said belt and of the gaff secured thereto, substantially as described.  
125

5. In a derrick-crane, the combination with  
a mast, of pivoted gaffs mounted upon supports adjacent thereto, and means carried by  
130 said mast for alternately raising and lowering the inner ends of said gaffs to cause the same to operate in alternation, substantially as described.

6. In a derrick-crane, the combination with



a mast, of an endless belt supported thereon, pivoted gaffs having their inner ends secured to the opposite sides of said endless belt, and means to actuate said gaffs to cause their inner ends to travel in opposite directions in the movement of said belt, substantially as described.

7. In a derrick-crane, the combination with a mast, of an endless belt supported thereon, pivoted gaffs having their inner ends secured to the opposite sides of said endless belt, and hoisting-ropes passing over the outer ends of said gaffs and carried by a winding-drum, substantially as described.

8. In a derrick-crane, the combination with a mast, of an endless belt supported thereon, pivoted gaffs having their inner ends secured to the opposite sides of said endless belt, hoisting-ropes carried by a winding-drum and passing over the outer ends of said gaffs, and counterpoise-ropes extending from said hoisting-ropes to said gaffs, substantially as described.

9. In a derrick-crane, the combination with a mast, of an endless belt supported thereon, a pivoted gaff having its inner end secured to said belt, a hoisting-rope carried by a winding-drum and passing over the outer end of said gaff, and a stop carried by said hoisting-rope and adapted to engage the outer end of said gaff to move the same in the movement of the hoisting-rope, substantially as described.

10. In a derrick-crane, the combination with a mast, of an endless belt supported thereon, a pivoted gaff having its inner end secured to said belt, a support adjacent to said mast, a boom pivoted to said support and also to said gaff, and means to actuate said gaff to cause the inner end thereof to travel with said belt, substantially as described.

11. In a derrick-crane, the combination of an upright mast A, the two gaffs C C' whose inner ends are pivoted to the shoes E E', operated by means of the belt O, the pulleys M and N, the friction-wheel P and lever T, to slide upon the tracks or ways R R', the gaffs supported at G G' by the booms D D' pivoted

at F F', the derrick-crane rigged with ropes H H', the counterpoise ropes and pulleys J J' and pulleys I I' operated by the hoisting-drums K K' all constructed and operated substantially as described and for the purposes set forth.

12. In a derrick-crane, the combination of the upright mast A, the guys B B B with one gaff C, the sliding shoe E, the track or way R, the boom D pivoted at G and F, the belt O with pulleys M and N, the friction-wheel P and lever T, the rope H, the pulley I, the counterpoise rope and pulley J J' and the driving-drum K, all constructed and operated substantially as described and for the purposes set forth.

13. In a derrick-crane, the combination with the mast, of a belt O mounted on pulleys and governed by a friction-wheel, said belt having one or more shoes fixed thereon and fitted to slide on the mast, the inner end of a gaff pivoted to each of said shoes, each gaff being rigged with hoisting-rope and sheaves and with a counterpoise, and supported near its center on a pivoted boom, the belt being used for the purpose of governing the automatic movement of the gaff or gaffs when loaded, as shown and described.

14. In a derrick-crane, the combination with a gaff whose inner end is pivoted to a shoe that is fitted to slide on the mast, said shoe being fixed at a belt mounted on pulleys and governed by a friction-wheel, and the gaff supported near the center by a pivoted boom, of the adjustable counterpoise J, said counterpoise being attached to the inner end of the gaff and having a sheave to ride on the hoisting-rope for the purpose of causing the gaff to swing inward or outward when loaded, as shown and described.

In witness whereof we have hereunto subscribed our names this 25th day of May, 1896.

WILLIAM L. McCABE.  
CHAS. H. ANDERSON.

Witnesses:

A. G. AVERY,  
B. S. GROSSCUP.