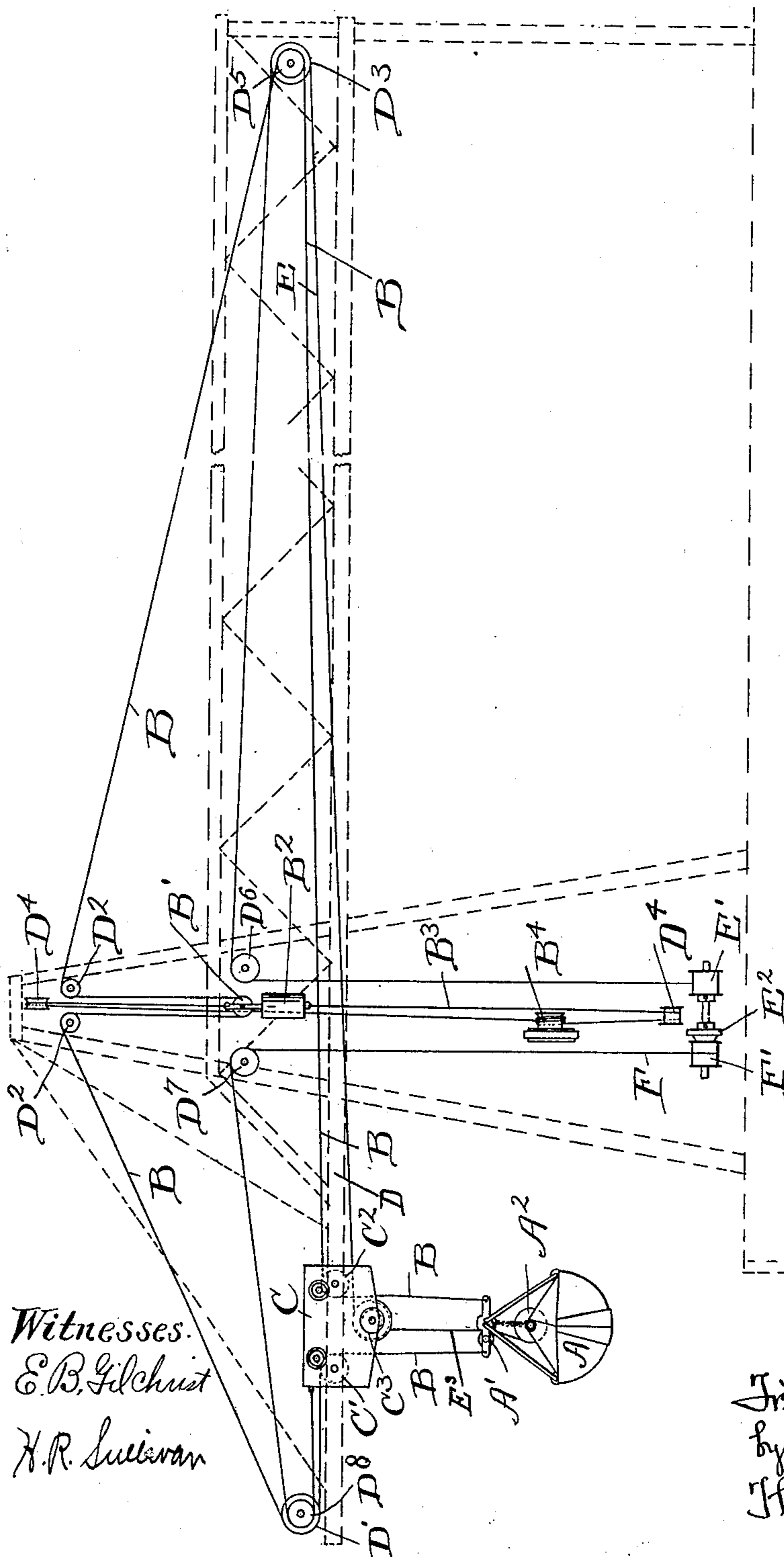


913.020.

Patented Feb. 23, 1909.



Witnesses:  
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Inventor

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# UNITED STATES PATENT OFFICE.

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## HOISTING APPARATUS.

No. 913,020.

Specification of Letters Patent.

Patented Feb. 23, 1909.

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*To all whom it may concern:*

Be it known that I, FREDERICK W. LOVELL, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Hoisting Apparatus, of which the following is a full, clear, and exact description.

The object of the present invention is to provide a hoisting apparatus for use in loading and unloading material, and is particularly adapted for unloading boats by means of clam shell buckets.

The invention particularly relates to an arrangement of the ropes used in hoisting, holding and conveying the buckets whereby certain advantages, not hitherto obtained, have been secured, as will appear more fully below.

It has especially been my endeavor to secure an arrangement in which the hoisting rope, which also serves as a trolleying rope, shall hoist the bucket through the medium of a differential drum, thus permitting a trolleying speed higher than the hoisting speed, while the holding rope, which in other arrangements must be taken up and paid out to the same extent with the taking up and paying out of the hoisting and trolleying rope will, in my arrangement, be automatically taken up and paid out in exact accordance with the hoisting or lowering of the bucket itself and will be independent of and unaffected by the extent of the trolleying movement of the bucket.

In the accompanying drawing, my arrangement is diagrammatically illustrated, the conventional hoisting derrick, bridge and boom being indicated in dotted lines.

The clam shell bucket A here shown has a suspension cross bar A' to each end of which is attached one end of the holding rope B. From one of these points of attachment, the rope B passes up over a sheave C' in the trolley carriage C, along the trolley bridge D, where it is reeved around a sheave D' and led to a pair of sheaves D<sup>2</sup> in the upper part of the derrick, thence down to a sheave D<sup>5</sup> in the other end of the trolley bridge back over a sheave C<sup>2</sup> in the trolley carriage to the other end of the suspension bar A' referred to. Between the two sheaves D<sup>2</sup> over which this holding rope is reeved at the upper part of the derrick, a bight in the rope is formed in which is suspended,

on a pulley block B', a weight B<sup>2</sup> sufficient to take up whatever slack there may be in the rope due to the bucket being raised. This weight has attached on its upper and lower side, the ends of a rope B<sup>3</sup> reeved about pulleys D<sup>4</sup> D<sup>4</sup> at the top and bottom of the derrick and coiled at an intermediate point about a loosely rotating drum B<sup>4</sup> under the control of a friction brake.

For the purpose of hoisting and trolleying the bucket, I have connected the power wheel A<sup>2</sup>, by which the bucket is closed, with a differential drum C<sup>3</sup> journaled in the trolley carriage, to the larger portion of which drum is secured a rope E reeved about a sheave D<sup>3</sup> at one end of the bridge and brought back over a sheave D<sup>6</sup> to a power driven drum E'. Attached to a second drum F' which I preferably mount alongside the power driven drum E' and have connected therewith by a friction clutch E<sup>2</sup>, is a return trolley rope F reeved over a sheave D<sup>7</sup> in the derrick and around the sheave D<sup>8</sup> at the end of the bridge back to and anchored to the trolley carriage.

In the operation of the device, supposing the bucket to be lowered on to the material and open to receive the same, the power drum E' operating the trolleying and hoisting rope E connected to the differential drum C<sup>3</sup> on the trolley carriage is put into action, the drum F' of the return trolley rope being disconnected from the operating drum E' and held against movement by friction brake or otherwise. The effect of this will be to cause a rotation of the differential drum C<sup>3</sup> on the trolley carriage, a winding up of the rope E<sup>3</sup> connected to the differential drum and the power wheel A<sup>2</sup> on the bucket, and the consequent rotation of the power wheel A<sup>2</sup>, causing the bucket to close.

After the bucket is closed, the further rotation of the differential drum C<sup>3</sup> will cause the entire bucket to be raised at a reduced speed, that is to say, at a speed less than that of the movement of the trolleying rope E attached to the differential drum. During this upward movement of the bucket, obviously the holding rope B will become slack and the slack therein is automatically taken up in the bight in which the weight B<sup>2</sup>, previously referred to, is swung and the distance of movement of this weight will obviously be no greater than the amount of rise of the bucket in hoisting operation.

This is of great importance, coupled with the fact that the arrangement is such that the movement of the weight which takes up the slack is independent of the distance through which the trolley carriage is shifted and thereby rendering it unnecessary to provide any unusual construction of derrick for the purpose of allowing this vertical rise and fall to take place.

10 When the bucket has been raised to the desired height, the brake is released from the drum  $F'$  to which the return trolley rope  $F$  is attached, the drum  $F'$  is locked by a clutch to the drum  $E'$  and further movement of the hoisting and trolleying rope  $E$  results in moving the trolley carriage and bucket along the bridge to any desired point for unloading, and as above pointed out, this transverse movement of the trolley carriage will not affect the amount of slack in the holding rope so that the lateral shifting of the bucket therefore does not affect the vertical position of the weight  $B^2$  which takes up such slack.

25 When it is desired to open the bucket for dumping the contents therefrom, the friction brake is applied to the drum about which is coiled the rope  $B^3$  attached to the slack weight  $B^2$ , while at the same time the hoisting and trolleying rope  $E$  is released. The result is that the bucket is held by the suspension bar  $A'$ , while the power wheel  $A^2$  is released and allowed to drop, thus opening the bucket. The drum for the return trolley rope is then operated to draw the carriage back to its original position. When the proper position is reached, the holding rope is released, the return drum is disconnected from the hoisting drum and the latter is allowed to pay out its rope until the bucket is lowered on to the material again.

It is obvious that certain changes in the detail arrangement can be made without departing from the spirit of my invention,

and I desire to include these in the scope of my claims.

Having thus described my invention, I claim:

1. Hoisting apparatus comprising a bridge, trolley carriage, and an automatic bucket having a holding rope and a hoisting and trolleying rope, and a weight mounted on the holding rope and arranged to automatically take up slack in said holding rope, the movement of said weight being no greater in extent than the vertical movement of the bucket.

2. Hoisting apparatus comprising a bridge, trolley carriage and an automatic bucket having a holding rope and a hoisting and trolleying rope, and means for automatically taking up slack in the holding rope, the operation of said means being independent of the lateral trolleying movement of the bucket.

3. Hoisting apparatus comprising a bridge, trolley carriage and an automatic bucket having a holding rope and a hoisting and trolleying rope the latter rope operating the bucket through the medium of a differential drum arranged to reduce the speed during the lifting of the bucket, and means to automatically take up the slack of the holding rope during the lifting operation.

4. Hoisting apparatus comprising a bridge, a trolley carriage mounted thereon, an automatic bucket having an attached holding rope and a combined hoisting and trolleying rope, and a weight suspended in a bight of the holding rope to automatically take up slack in said holding rope.

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

FREDERICK W. LOVELL.

Witnesses:

H. R. SULLIVAN,  
E. B. GILCHRIST.