

(No Model.)

3 Sheets—Sheet 1.

D. C. BOYCE.

## LOADING AND UNLOADING APPARATUS.

No. 342,424.

Patented May 25, 1886.

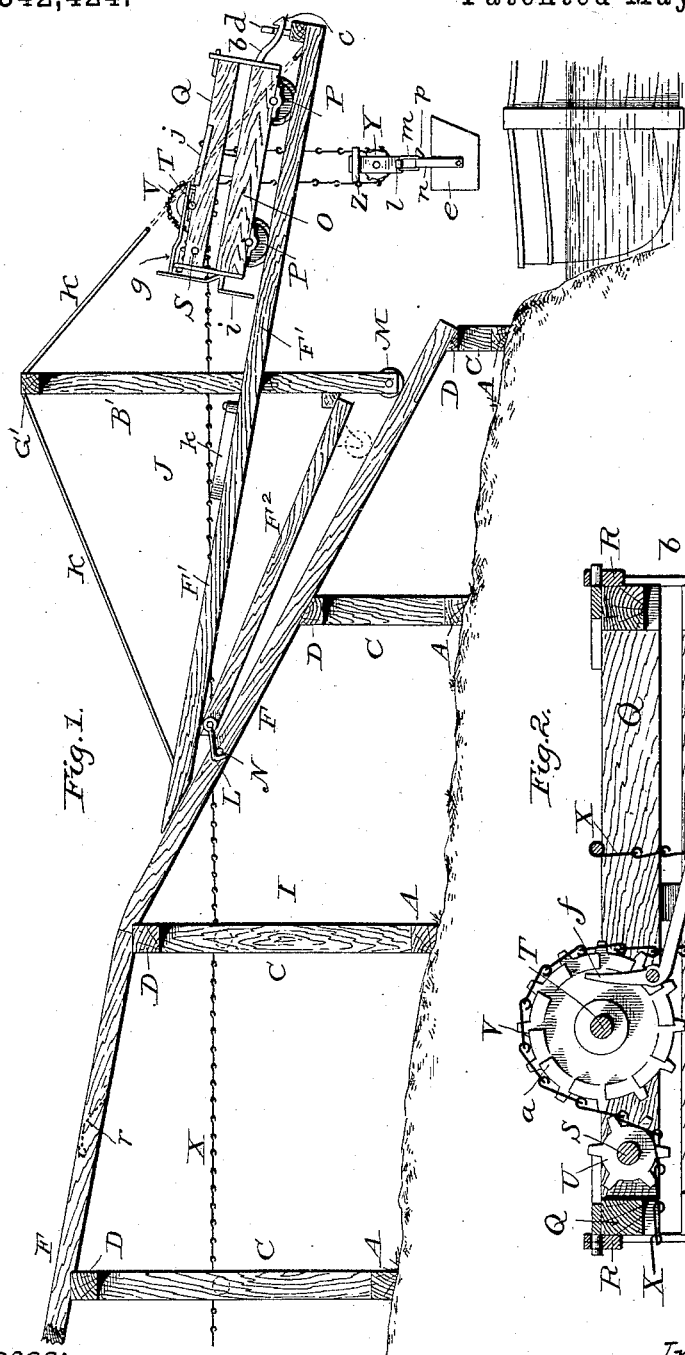


Fig. 1.

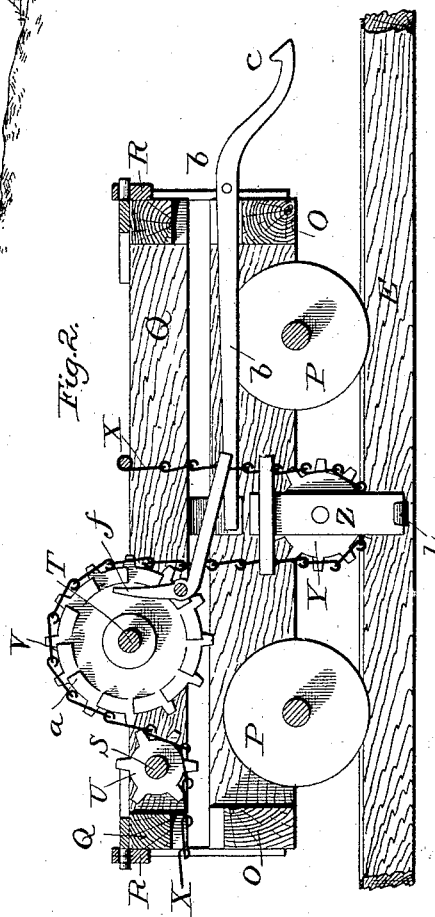


Fig. 2.

Witnesses:

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*Inventor:*

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Fig. 3.

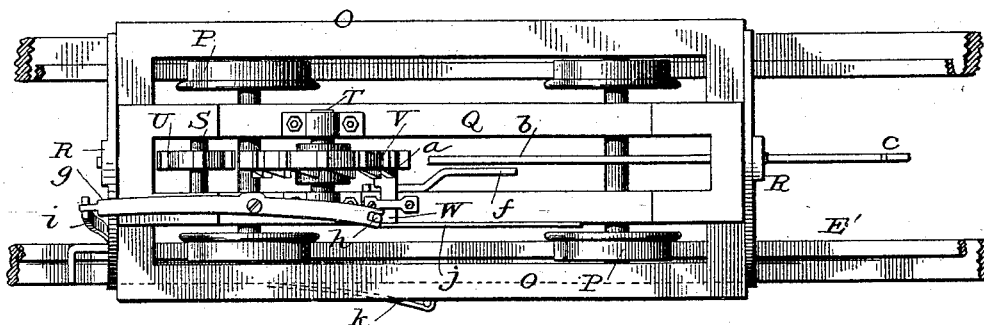


Fig. 4.

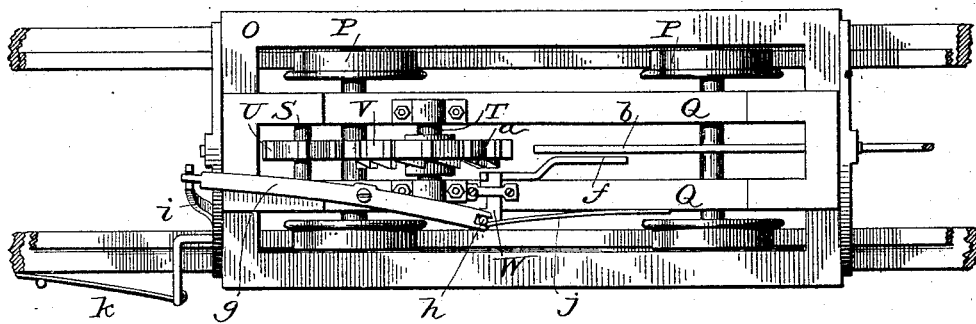
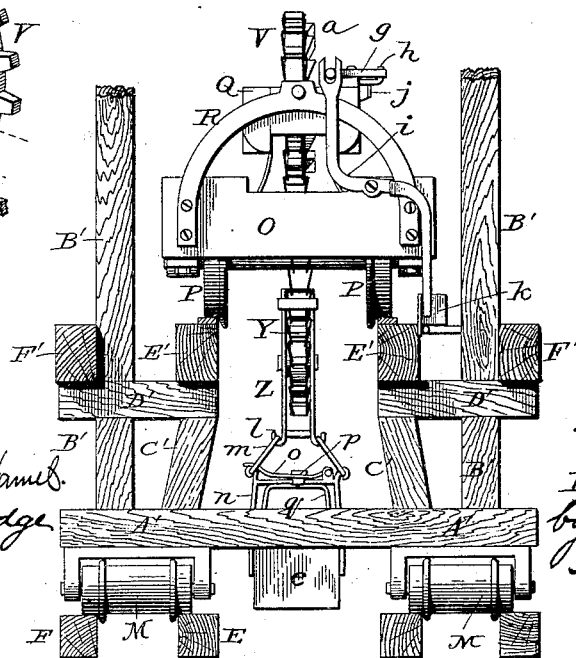
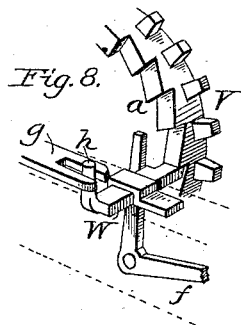


Fig. 5.



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(No Model.)

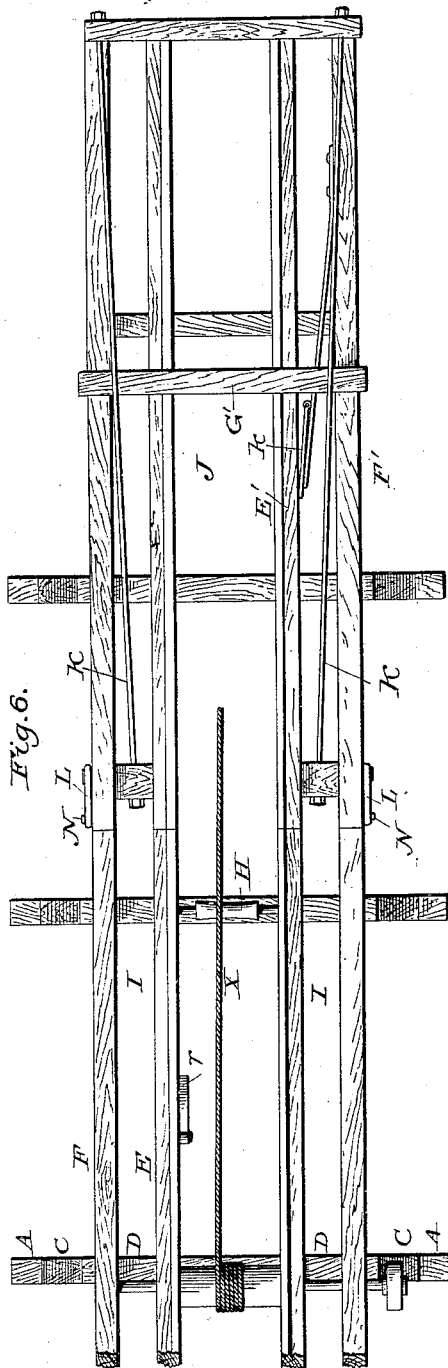
3 Sheets—Sheet 3.

D. C. BOYCE.

LOADING AND UNLOADING APPARATUS.

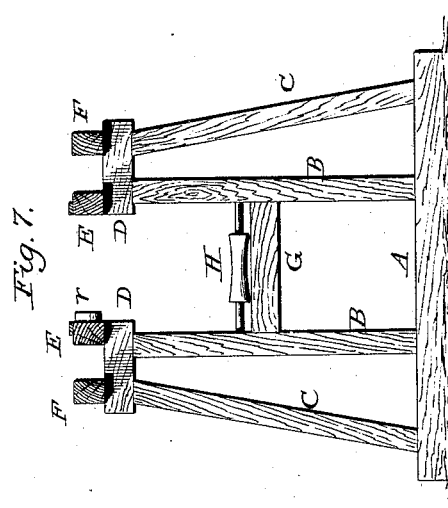
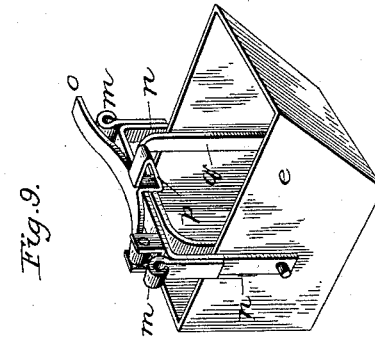
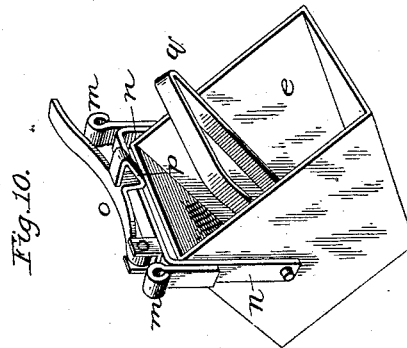
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Witnesses:

James P. Duhamel  
Walter S. Dodge



Inventor:

D. C. Boyce,  
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# UNITED STATES PATENT OFFICE.

DARWIN COVERT BOYCE, OF MALDEN, WEST VIRGINIA.

## LOADING AND UNLOADING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 342,424, dated May 25, 1886.

Application filed November 20, 1885. Serial No. 183,387. (No model.)

*To all whom it may concern:*

Be it known that I, DARWIN COVERT BOYCE, of Malden, in the county of Kanawha and State of West Virginia, have invented certain new and useful Improvements in Apparatus for Loading and Unloading, of which the following is a specification.

My invention relates to an apparatus for loading and unloading; and it consists in a novel construction of the same, as hereinafter more fully set forth.

In the drawings, Figure 1 is a side view of my improved apparatus in use; Fig. 2, a vertical longitudinal section through the car; Figs. 3 and 4, top plan views of the car or carriage in different positions; Fig. 5, an end view of the same; Figs. 6 and 7, views illustrating the construction of the trussing or framing; Figs. 8, 9, and 10, views illustrating details.

The principal features of my invention, briefly stated, consist in the combination, with a stationary or fixed frame-work or trussing, of an adjustable or movable frame-work mounted upon the former, so as to adapt itself to various contingencies that arise in its use, in a novel construction of the car or carriage which receives the load, and in other features and details hereinafter set forth.

Upon suitable sills or timbers, A, are uprights B C, suitably connected at the top by cross-timbers D, which latter receive the track-beams E and longitudinal timbers F, as shown in Figs. 1, 5, 6, and 7. The uprights B are connected by cross timbers or braces G, as shown in Fig. 7, and above the braces G, between the uprights B, are journaled rollers H. This forms the main or stationary trussing I, which, as will be seen upon referring to the drawings, is exceedingly stiff, and yet simple and cheap in construction. It will also be noticed, upon referring to Figs. 3, 4, 5, 6, and 7, that the central portion between the tracks is unobstructed throughout the entire length of the track. This main frame-work extends from the warehouse or other structure to the edge of the water, and its end tapers or inclines downward toward the water, railway-track, or other loading or unloading point, as shown in Fig. 1.

J indicates a movable section of the framing or trussing, composed of timbers A' B' C' D' E'

F', corresponding to a greater or less extent with those of frame I. The uprights B' extend upward between and above E' and F', and are there connected by the cross-brace G', the uprights B' being about midway between the ends of the section J. Suitable braces, K, extend from the top of uprights B' to the ends of timbers E' F', as shown in Figs. 1 and 6. Below the members E' F' of frame J are timbers E<sup>2</sup> F<sup>2</sup>, (seen in side elevation in Fig. 1,) which are secured at one end to the lower ends of uprights B' and at their other ends to the ends of the frame J, these timbers F<sup>2</sup> being provided on their side faces with hooks L, as shown in Figs. 1 and 6. The lower ends of the uprights B' or the base-blocks A' are provided with rollers M, which bear upon the timbers E F of the main frame I, as shown in Figs. 1 and 5.

Having thus constructed the frames I J, it will be seen that the latter can be moved up and down upon the former, and may be held at any desired position by means of the hooks L, engaging over studs or pins N upon the stationary frame I, or in any equivalent manner. This construction is for the purpose of allowing the car to be run out at different elevations, which is rendered necessary in unloading vessels by different-sized vessels and by reason of varying conditions of the water, whether high or low.

It will be observed that instead of using rollers M at the ends of uprights B', rollers may be seated in the lower faces of the timbers E<sup>2</sup> F<sup>2</sup>, as shown by dotted lines in Fig. 1.

Referring now to Figs. 1, 2, 3, 4, and 5, the construction of the car will be explained.

The car O consists of a rectangular main frame mounted on wheels P and carrying an upper rocking frame, Q, which latter is journaled in brackets R, secured to the front and rear ends of the car.

S and T represent shafts, which are journaled near the forward end of frame Q, the former carrying sprocket-wheel U, and the latter a combined ratchet and sprocket wheel V, as clearly shown in Fig. 2. The wheel V has on its side ratchet-teeth a, which at certain times receive sliding dog W, which prevents the rotation of wheel V in one direction.

X indicates a link-chain, which is connected in the warehouse with any suitable power, passes to the car under wheel U, up over wheel V, down around a sprocket-wheel, Y, the axle of which sustains a frame, Z, and finally up to the rocking carriage Q, to which it is attached, as shown in Fig. 2.

Pivoted at or near the end of the car O, and extending nearly to the center thereof, is a lever, *b*, the outer end of the lever extending out beyond the end of the carriage and provided with a hooked end, *c*, to engage a lug or stop, *d*, at the outer end of frame J, as shown.

In the frame Q, by the side of wheel V, is a pivoted elbow-lever, *f*, which, as shown in Figs. 3 and 4, engages in a notch or recess in the side of the sliding dog W, so that when the lever *f* is in the position shown in Figs. 2 and 4 the dog W is held in position out of engagement with ratchet-teeth *a*. The tail of elbow-lever *f* extends beside the tail of lever *b*, as shown in Figs. 2, 3, and 4, and both are immediately over the frame Z, so as to be struck and tipped thereby when the latter reaches the desired elevation.

Upon the upper face of the frame Q is a lever, *g*, pivoted midway between its ends, as shown in Figs. 3, 4, and 5, one end of said lever being forked to straddle a pin, *h*, on the sliding dog W, and the other end being inserted in the upper forked end of a lever, *i*, pivoted to the front of the carriage O. It will be seen that as the lever *g* is rocked on its pivot horizontally it will throw the sliding dog into or out of engagement with the ratchet-teeth *a* of wheel V when permitted by lever *f* so to do. A spring, *j*, secured upon the side of frame Q, and bearing on the slide or dog W, serves to urge the dog inward toward the wheel. The lever *i*, referred to, extends downward below the side of the carriage O, as shown in Figs. 1, 3, 4, and 5, and is arranged to be rocked upon its pivot by coming into contact with an incline or switch, *k*, upon the track. When the car is out at the end of the frame, as in Fig. 1, the hook *c* engages under the stop *d* and prevents the carriage from being moved when power is applied to the chain X, but which allows the chain to raise the wheel Y, its frame Z, and the bucket *e*. As the casing Z and the bucket *e* reach the limit of their movement the frame or casing Z strikes the free ends of the pivoted levers *b* and *f* and raises them, thereby releasing the hook *c* from stop *d* and throwing the lever *f* out of the notch in the sliding dog W. As this is done the spring *j* throws the sliding-dog W into engagement with the ratchet-teeth *a* and prevents rotation of the wheel V, and consequent further elevation of the bucket or load. This movement of the spring *j* and dog W causes a movement of levers *g* and *i*, and throws the downwardly-extending tail of the latter inward out of line with the switch or incline *k*, so that as the car is drawn up-

ward by the chain X the lever *i* will not be affected by the incline. On the return movement of the car the lever *i* strikes against the outer face of the incline *k*, whereupon the upper end of lever *i* is thrown inward, the lever *g* rocked on its pivot, and the sliding dog W withdrawn from the ratchet-teeth *a*. As this is accomplished the wheels U V turn and allow the frame Z to fall slightly, and levers *b* *f* being thus set free tip upon their pivots, the former hooking under the catch *d* and the latter engaging with sliding dog W and holding the same out of engagement with teeth *a*.

The carriage being thus held in place, and the wheels U V being free to turn, the chain X is paid out and the block Z and bucket *e* allowed to descend for a new load.

Referring now to Figs. 9 and 10 the construction and operation of the bucket and its apparatus will be explained.

The frame or casing Z, carrying sprocket-wheel Y, has ears *l* on its lower edge at each side, which engage with loops or eyes *m* on a yoke, *n*, pivoted to the bucket *e*. On the yoke *n* is a pivoted catch, *o*, which has a hook or nose, *p*, to engage over the bail *q* of the bucket, as shown in Figs. 5 and 9, and the end of which extends out beyond the side of the bucket. The bucket is pivoted eccentrically to the yoke *n*, so that when released the bucket will tip automatically.

At any suitable or desired point along the framing, on the inside of the rails E, is an incline or lug, *r*, (shown in Figs. 1, 6, and 7,) upon which, when the car reaches that point, the tail of the pivoted catch *o* rides, and by which it is raised. When the end of the catch *o* is thus raised the nose *p* is raised off the bail *q* and the bucket allowed to tip and discharge its contents.

The object of providing the car O with a rocking frame from which the hoisting-chain is suspended is to allow the chain and bucket to swing to either side, as it is not always possible to get the bucket directly over the opening. Twisting and straining of the car is thus prevented, and considerable range of movement afforded the bucket and the elevating-chain.

The trip *r*, for tipping the bucket, may in some cases be omitted, and the bucket tipped by means of a cord running to the operator's stand. In this case a catch or hook will be placed upon the front end of the car, so as to hold the latter and allow the bucket to be raised and lowered through the car when the latter is on the main frame I. This is particularly desirable for hoisting and conveying coal when it is not desired to drop the contents of the bucket from the top of the section I.

Under the plan last above described the bucket may be lowered to any desired point and there tipped, thus avoiding undue breaking of the coal.

The invention is applicable for hoisting and

conveying as well as for loading and unloading.

Having thus described my invention, what I claim is—

1. In a device for loading and unloading, the combination, with a fixed frame-work, of an adjustable section mounted upon the fixed section, substantially as shown and described.
2. In apparatus for loading and unloading, the combination, with a fixed section of frame-work having an inclined end, of an adjustable section movable upon the inclined end, as shown, and for the purpose set forth.
3. In apparatus for loading and unloading, the combination, with a stationary section of frame-work open throughout its length between its tracks, of an adjustable section mounted thereupon, and also open, as shown.
4. In apparatus for loading and unloading, the combination, with a stationary section of frame-work having an inclined end, of a movable section adjustable upon the stationary section, and provided with rollers, as at M, for the purpose set forth.
5. In combination with a track, a car movable thereupon, a combined sprocket and ratchet wheel mounted upon the car, a hoisting-chain passing about said wheel, a dog, a catch for holding said dog, and mechanism, substantially such as shown, for releasing the catch and allowing the dog to engage the wheel.
6. In combination with a track, E, car O, provided with wheel V, chain X, sliding dog W, pivoted catch *f*, spring *j*, and casing or frame Z, arranged as shown.
7. In combination with a track, a car movable thereupon, a combined sprocket and ratchet wheel, a hoisting-chain, a dog, a catch for holding said dog normally out of engagement with said wheel, a catch for holding the car, and a frame or casing, arranged, substantially as shown, to simultaneously release the car and the dog, whereby the movement of the chain will cause the car and its load to move upon the track.
8. In combination with track E, car O, provided with combined sprocket and ratchet wheel V, sliding dog W for engaging said wheel, pivoted catch *f* for holding said dog out of engagement with wheel V, pivoted lever *b*, provided with hook *c*, to engage stop *d*,

chain X, passing about wheel V and carrying frame Z, and spring *j*, all arranged as shown, whereby the elevation of the load is caused to release the car and prevent movement of the chain independent thereof.

9. The combination, with a track, of a car provided with a combined sprocket and ratchet wheel, a lifting-chain, a dog to engage with the wheel and prevent its rotation, a lever mounted upon the car and connected with the dog, a second lever connected with the first and mounted upon the car, and an incline or switch upon the track in the line of travel of the second lever, to rock said lever and release the sprocket-wheel when the car returns.

10. In combination with track E, car O, provided with sprocket and ratchet wheel V, chain X, dog W, lever *g*, connected therewith, lever *i*, mounted upon the carriage and connected with lever *g*, and incline *k* in the line of travel of lever *i*.

11. In apparatus for loading and unloading, the combination, with a track, of a car movable thereupon, consisting of a main fixed section, O, and a rocking section, Q, and hoisting devices mounted upon the rocking section.

12. The herein-described car, consisting of main frame O, wheels P, brackets R, and rocking frame Q, journaled in the buckets and carrying-wheels U V.

13. The herein-described car, consisting of main frame O, wheels P, brackets R, rocking frame Q, shafts S T, wheels U V carried thereby, levers *b f g i*, sliding dog W, spring *j*, chain X, frame or casing Z, all arranged as shown.

14. In apparatus for loading and unloading, the bucket *e*, provided with bail *g*, yoken, pivoted eccentrically to bucket *e* and provided with gravitating pivoted catch *o*, and a device for raising the pivoted catch.

15. In combination with track E, car O, chain X, wheel Y, and frame or casing Z, bucket *e*, provided with yoke *n*, bail *g*, and pivoted catch *o*, and incline *r*, all arranged as shown.

DARWIN COVERT BOYCE.

Witnesses:

J. W. PARRISH,  
E. OAKES.

It is hereby certified that in Letters Patent No. 342,424, granted May 25, 1886, upon the application of Darwin Covert Boyce, of Malden, West Virginia, for an improvement in "Loading and Unloading Apparatus," an error appears in the printed specification requiring correction, as follows: In line 80, page 3, the word "buckets" should read *brackets*; and that the Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 1st day of June, A. D. 1886.

[SEAL.]

H. L. MULDROW,  
*Acting Secretary of the Interior*

Countersigned:

M. V. MONTGOMERY,  
*Commissioner of Patents.*