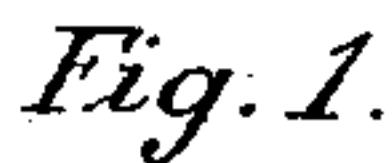


3 Sheets—Sheet 1.

### TRAMWAY FOR HOISTING AND DUMPING APPARATUS.

Patented Dec. 17, 1895.



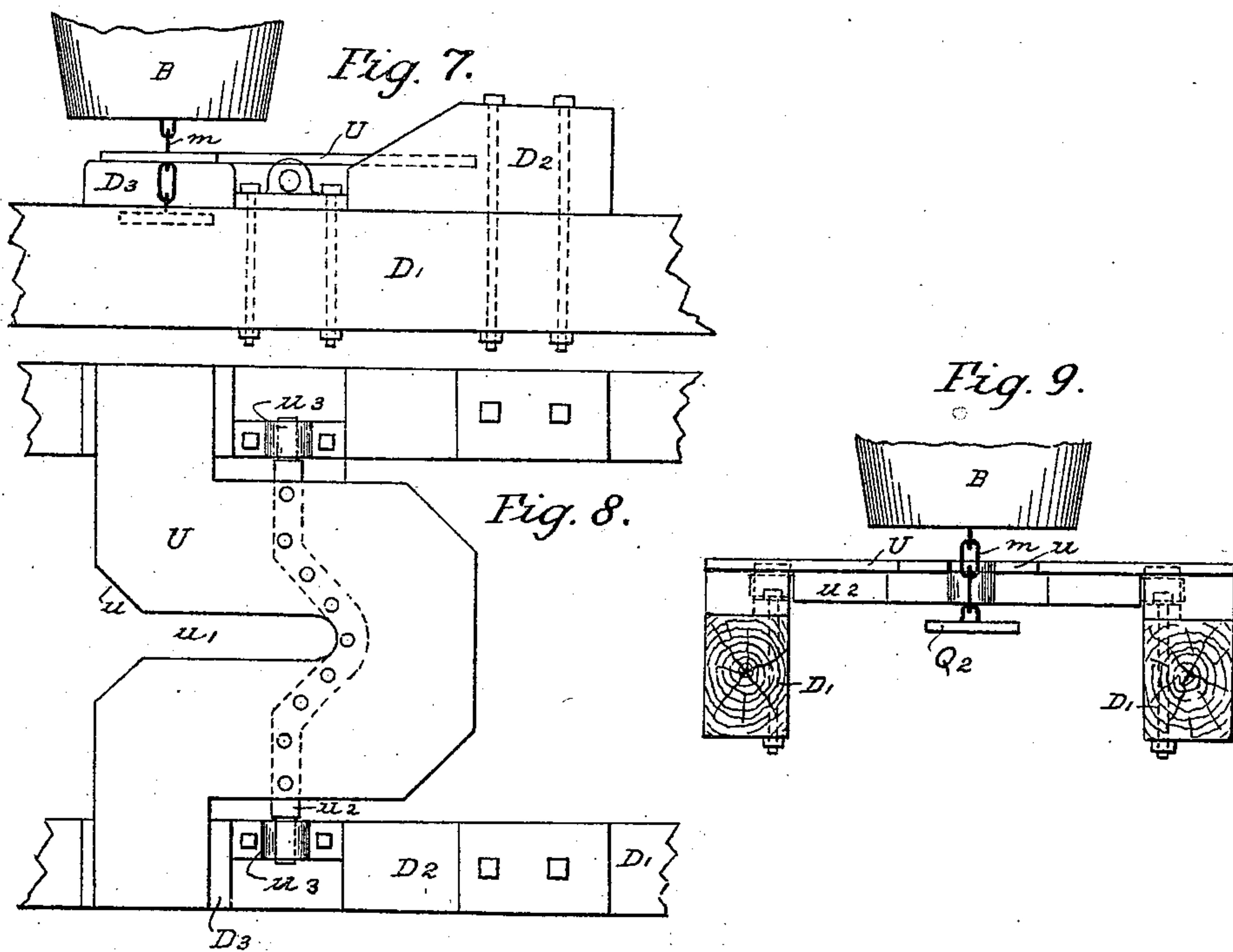
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3 Sheets—Sheet 2.

## TRAMWAY FOR HOISTING AND DUMPING APPARATUS.

Patented Dec. 17, 1895.



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# UNITED STATES PATENT OFFICE.

JOHN BRUCE AND HENRY C. MARCUS, OF ASPEN, COLORADO.

## TRAMWAY FOR HOISTING AND DUMPING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 551,745, dated December 17, 1895.

Application filed December 4, 1894. Serial No. 530,790. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN BRUCE and HENRY C. MARCUS, citizens of the United States, residing at Aspen, in the county of Pitkin and State of Colorado, have invented certain new and useful Improvements in Tramways; and we do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The object of our invention is to construct a tramway provided with devices by which the bucket or vessel carrying the materials hoisted from a mine or any other place and to be transported will attach to a tram-car. This tram-car will transport the bucket or vessel to the dumping place. Here the bucket will disengage from the tram-car, turn over and dump its contents, then by hoisting the bucket back to a standing position it will again attach to the tram-car and return to the head of the tramway, to be lowered to the place for refilling.

Our tramway is simple, durable, and comparatively inexpensive. All the work, except the hoisting and lowering of the bucket, is performed automatically.

Our invention consists in the construction of our tramway, and it also consists in details of construction and combinations of parts, all as hereinafter fully described.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of the shaft of a mine, the gallows-frame, and the tramway-supports, exposing a side elevation of the tramway proper. Fig. 2 is a top view of the tramway. Fig. 3 is a top view. Fig. 4 is a side elevation. Fig. 5 is an end elevation, and Fig. 6 is a longitudinal vertical section, of the tram-car. Fig. 7 is a side elevation. Fig. 8 is a top view, and Fig. 9 is a front elevation, of the tilting plate. Fig. 10 is a top view of the turn-table, and Fig. 11 is a vertical section of the same. Fig. 12 is a top view of the stop-plate. Fig. 13 is a side elevation of the same.

The frame A is an ordinary mine gallows-

frame supporting the sheave *a*. The hoisting-rope C extends from the drum of a hoisting-engine over the sheave *a* of the gallows-frame and supports and operates the bucket B. The trestles A' A<sup>2</sup> A<sup>3</sup> A<sup>4</sup> support the track—i. e., the inclined stringers D and the track-rails E.

F is the tram-car. U is the tilting plate. T is the turn-table, and S is the stop-plate.

The tram-car F is a four-wheeled truck. The truck-platform *f* has at its center an oblong opening or slot *f*<sup>2</sup>. Through this slot *f*<sup>2</sup> extends the bucket-supporting rope C. Said slot *f*<sup>2</sup> must be wide enough to admit the bearing-cone Q, which is attached to the rope C. The lugs *f*<sup>1</sup> of the truck-platform prevent the jaws I from sliding sidewise beyond the center of the platform *f*. The beveled projections *f*<sup>3</sup> at each end of the truck-platform serve to guide the catch K and form a notch or catching place for the said catch K. The standards *f*<sup>4</sup> support the sheave or roller M. They are placed so that the bearing circumference of the sheave M will be perpendicular over the center of the slot *f*<sup>2</sup>, in order that the rope C may travel at or near the center of the said slot. The plates *f*<sup>5</sup> prevent the jaws I from moving vertically. The flanges *f*<sup>6</sup> are seats for the springs P, which actuate the jaws I. The two flanges *f*<sup>7</sup> at the bottom of the truck-platform *f* serve to strengthen the said platform.

The two jaws I are strong flat bars. Their ends are provided with the bevel *i*, and the sides facing each other when the jaws I are in their proper places have a recess *i*<sup>2</sup>. The bevels *i* form a flaring opening for receiving the pointed ends of the catch K, and the recesses *i*<sup>2</sup> form a channel or opening for the rope C. The jaws I are placed on the truck-platform *f*, as shown in Fig. 3, and they are held in their proper positions by the projections *f*<sup>3</sup>, the lugs *f*<sup>1</sup>, and the plates *f*<sup>5</sup>. The jaws are actuated by the springs P. When the said jaws are forced apart by the catch K, the channel formed by the recess *i*<sup>2</sup> will admit the bearing-cone Q of the rope C. As soon as the catch K is disengaged from the jaws I, they will be forced together by the springs P, so that the lower or bearing side of the cone Q will engage the top side of the



jaws I, and thus the bucket B is carried and transported by the tram-car down the inclined track to the place of dumping.

The tilting plate U is riveted to the axle  $u^2$ .

5 This axle revolves in the journal-boxes  $u^3$ .

The tilting plate is supported by the stringers D', and these stringers D' are fastened to the trestles A<sup>3</sup> and A<sup>4</sup>. The tilting plate U is provided with a slit  $u'$  with a flaring mouth  $u$ .

10 The chain  $m$  fastened to the bottom of the bucket B will enter the slit  $u'$  of the tilting plate, as illustrated in Figs. 7 and 9, and as soon as the bucket B takes its seat on the tilting plate U, this will tilt and the contents of

15 the bucket will be dumped. During the operation of dumping the bottom of the bucket B is connected or held to the tilting platform U by the plate Q<sup>2</sup>, which is attached to the bucket B by the chain  $m$ .

The block D<sup>2</sup> will

20 prevent the tilting plate U from tilting more than is necessary. The tilting plate is balanced so that it will always remain in a horizontal position when not in contact with the bucket B.

25 The head of the tramway, which is perpendicularly over the shaft, is provided with a turn-table T. This turn-table T is mounted upon and supported by the flange  $o^2$  of the casting or plate T', and T' is fastened to the

30 gallows-frame of the mine-shaft. The flange  $o^2$  has a rounded top, in order to reduce friction, and it forms the inner semicircular edge or side of the plate T'. This edge or flange  $o^2$  is formed by a radius from the center of the

35 turn-table T. The plate or casting T' is provided with the flange  $o$  and the brackets  $o'$ .

The center of the turn-table T is perpendicularly over the center of the mine-shaft, and it is provided with a segmental opening or

40 slit  $t$ , which extends somewhat beyond the center of the table T, in order that the rope C may extend through this opening  $t$ . The said opening  $t$  must be wide enough to admit the bearing-cone Q. The turn-table T is further

45 moreover provided with the standards  $t'$ , which support the deflection-sheave R, the inclined rails  $t^2$ , and the car-stop  $t^3$ . The catch K is attached to the top of the turn-table T by the

50 stand  $t^4$ . The stand  $t^5$  attaches the lever L to the bottom of the turn-table. The outer edge or rim may be geared, as indicated in Fig. 10, so that the operation of turning the turn-table may be performed, with the proper lever-

55 age or gearing, from the foot of the gallows-frame or from the hoisting-engine, as indicated in dotted lines in Figs. 1 and 10. To prevent the turn-table T from tilting it bears also on the plates  $d$ , which are supported by the stringers D.

60 The lever L is forked, and the space between the forks or prongs is located perpendicularly under the opening  $t$  of the turn-table T, and the said space is wide enough to admit the passage of the bearing-cone Q.

65 The lever L is pivoted to the stand  $t^5$ , and it is connected to the catch K by the rod  $l$ . This rod  $l$  extends through an opening in the

turn-table and is provided with a stop-collar

$l'$  and a spring W. It is pivoted to the lever

L and to the catch K. The stop-collar  $l'$  and

70 the spring W serve to hold the lever L and the catch K in their proper positions. The

catch K is provided with a pointed head  $k$

and a hook  $k'$ .

In hoisting the bucket B from the mine,

75 the plate Q', which is attached to the chain  $m'$  immediately above the bail of the bucket B, will engage the lever L and lift it. This lifting is communicated to the catch K by means

80 of the rod  $l$ , and will disengage the catch K from the jaws I and also unhook the tram-

car. The bucket B, being now supported by the tram-car F, is ready to be transported to the dumping place.

The stop-plate S is placed on the track per-

85 pendicularly over the tilting plate U. It is provided with the flanges  $s$ , which form a stop for the wheels of the tram-car F. The stop-plate S is solidly fastened to the rails E

90 or the stringers D. Its function is to stop the tram-car F and to furnish a support for the

stand  $t^5$  of the lever L and the stand  $t^4$  of the

catch K. The lever L and the catch K and their attachments are constructed like those

95 connected with the turn-table T. The plate Q<sup>2</sup> is fastened to the bottom of the bucket B by means of the short chain  $m$ . The bail of

the bucket is fastened to the plate Q' and the chain  $m'$  attaches the plate Q' to the bearing-

100 cone Q, which is fastened to the hoisting-rope C. The chain  $m'$  is somewhat longer than the space intervening the lever L and the top

of the jaws I of the tram-car F. The plate Q' must be large enough to prevent its passing between the prongs of the forked lever L.

105 The turn-table T of our tramway may be connected with several tracks all radiating from a common center—to wit, the center of the turn-table—as shown in Fig. 2. By turning the table until its rails  $t^2$  register with the

110 rails on any one of said tracks the car can be run off to any of the dumps to which said tracks lead.

The operation of our tramway is as follows:

115 When the tram-car F is placed on the turn-table T, so that the catch K is attached to the notch  $f^3$ , the jaws I are spread, the rope C travels between the sheaves or rollers R and M, and extends through the channel formed by the jaws I, the slot  $f^2$  of the truck-platform

120  $f$ , the opening  $t$  of the turn-table T and the space between the prongs of the forked lever L. In hoisting the bucket B, when the bearing-cone Q reaches a point somewhat above the jaws I of the tram-car, the plate Q' will

125 engage the lever L and lift it. This will disengage the catch K from the jaws I, which will be closed up by the springs P, thus forming a bearing for the cone Q—i. e., the bucket B is attached to the tram-car F. In slackening the

130 rope C, the tram-car F will travel down the inclined track to the stop-plate S at the dumping place. At the moment the tram-car F is stopped, the catch K will engage the jaws I



and release the bearing-cone Q, and further-  
 more attach or hook the tram-car to the stop-  
 plate, the chain *m* at the bottom of the  
 bucket B having entered the slit *u'* of the tilt-  
 ing plate U. The further slackening of the  
 rope C allows the bucket to reach the tilting  
 plate U, tilt over and to assume the position  
 shown in Fig. 1, and dump its contents. Dur-  
 ing the operation of dumping the bottom of  
 the bucket B is connected or held to the tilt-  
 ing plate U by means of the chain *m* and the  
 plate Q<sup>2</sup>. In hoisting the bucket B it will dis-  
 engage from the tilting plate U, and again at-  
 tach to the tram-car F and return to the turn-  
 table T at the head of the tramway, to be low-  
 ered for refilling.

Having described our invention, what we  
 claim is—

1. In a hoisting and dumping apparatus, the  
 combination with a series of tracks, of a turn-  
 table provided with a radial slot, the stand-  
 ards *t'*, the sheave R journaled therein, the  
 inclined rails *t*<sup>2</sup>, the stop block *t*<sup>3</sup>, the uprights  
*t*<sup>4</sup> and the hanger *t*<sup>5</sup>, a catch K pivoted in the  
 uprights *t*<sup>4</sup> and having a pointed head *k* and  
 hook *k'*, the lever L hinged to the hanger *t*<sup>5</sup>, and  
 having a forked end straddling the slot *t*, the  
 rod *l* pivoted at one end to the catch K and at  
 the other to the lever L and passing through  
 the turn table, the spring W encircling said  
 rod below the turntable, the bucket B, the  
 hoisting rope C attached thereto, having a  
 plate Q<sup>2</sup> below the lever L, and adapted to run  
 in contact with the sheave R, the cone Q at-  
 tached to said rope and adapted to pass  
 through the slot *t*, and a tram car on the rails  
 provided with automatic catches for receiving  
 and supporting the cone *a*, substantially as  
 described.

2. In a hoisting and dumping apparatus,  
 the combination with two or more inclined  
 tracks, of a turntable having a radial slot, and  
 a peripheral rim or flange, an annular seg-

mental track for supporting said flange, a  
 catch or pawl attached to said table, a tripping  
 lever pivoted to said table, and a rod connect-  
 ing said catch and lever, the end of the lever  
 lying in line with the radial slot in the table,  
 so as to be adjacent to a hoisting cable passing  
 through said slot, substantially as described.

3. In a hoisting and dumping apparatus, a  
 car having a slot for the hoisting cable to pass  
 through, a lug at each end of said slot, a pro-  
 jection at each end of the car, two bars lying  
 between said projections, one on each side of  
 the slot, having their adjacent sides cut away  
 along the middle, and receiving the lugs in  
 said cut-away opening, and springs forcing  
 the bars toward each other, substantially as  
 described.

4. In a hoisting and dumping apparatus, the  
 combination with a car having a slot for the  
 hoisting cable to pass through, a bar on each  
 side of the slot, having each end beveled off on  
 the inside, springs at each end of said bars to  
 hold them yieldingly together, and a lug at  
 each end of the car adjacent to the ends of  
 said bars, of a stationary arrow-headed catch  
 at each end of the car track, adapted to force  
 apart said bars at the same time it engages  
 with the lug, substantially as described.

5. In a hoisting and dumping apparatus, the  
 combination with a traveling bucket, having  
 a plate Q<sup>2</sup> attached to its bottom by a short  
 chain, of a plate mounted on trunnions and  
 containing a slit to receive said chain, said slit  
 extending beyond the axis of the trunnions,  
 substantially as described.

In testimony whereof we affix our signa-  
 tures in the presence of two witnesses.

JOHN BRUCE.

HENRY C. MARCUS.

Witnesses:

J. J. YECKEL,

SAMUEL SELDEN.