

No. 713,932.

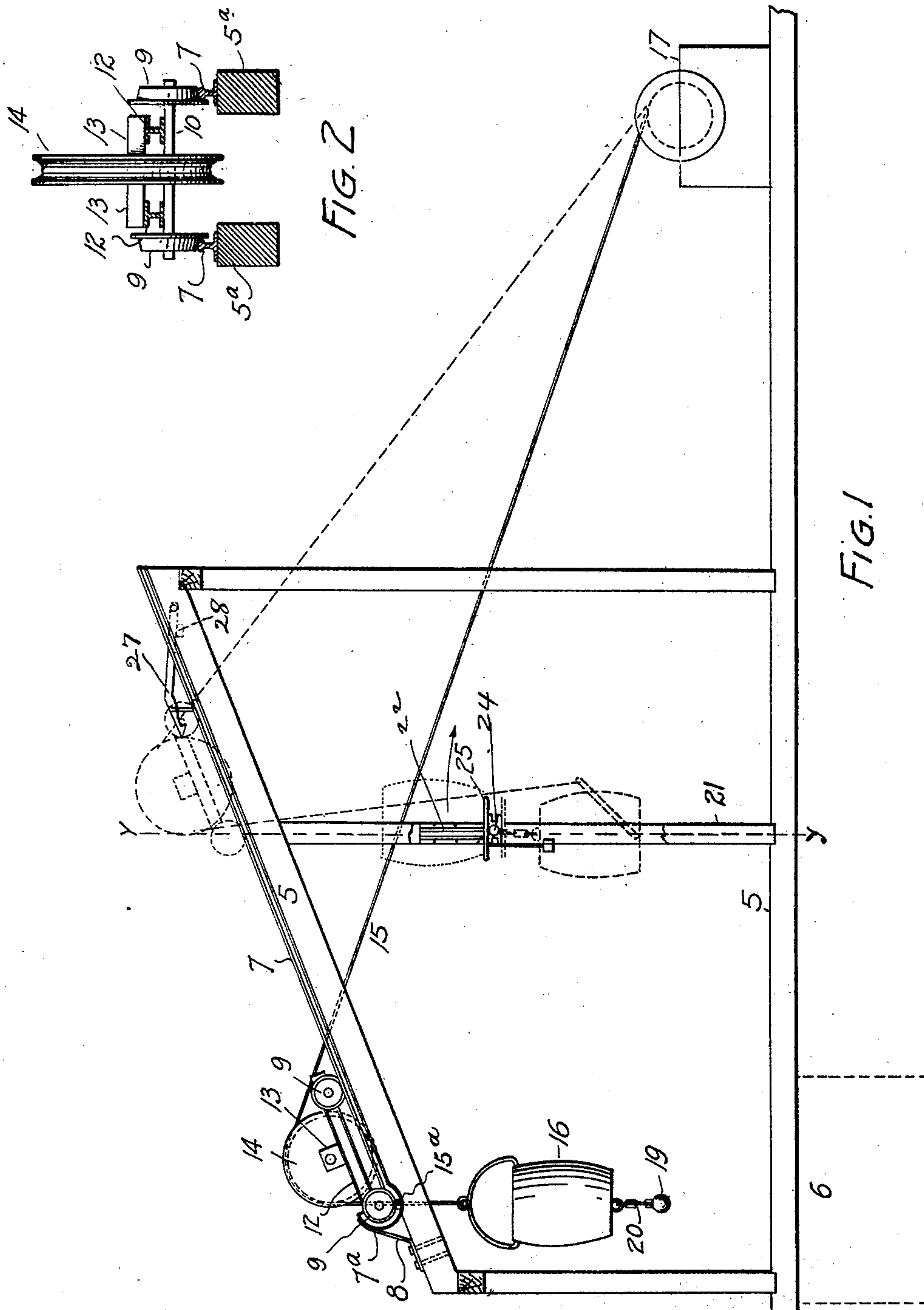
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T. E. ANDERSON.  
AUTOMATIC BUCKET DUMPING MECHANISM.

(Application filed Apr. 15, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:  
*P. J. Delemant.*  
*Dora C. Shick.*

INVENTOR.  
*T. E. Anderson.*  
BY *W. B. Snell* ATTORNEY.





# UNITED STATES PATENT OFFICE.

TURY E. ANDERSON, OF DENVER, COLORADO, ASSIGNOR TO DAVID P. McDONALD, OF DENVER, COLORADO, AND FAIRBANKS, MORSE & CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## AUTOMATIC BUCKET-DUMPING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 713,932, dated November 18, 1902.

Application filed April 15, 1901. Serial No. 55,995. (No model.)

*To all whom it may concern:*

Be it known that I, TURY E. ANDERSON, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Automatic Bucket-Dumping Mechanism; and I 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 figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in automatic dumping mechanism for ore-buckets, my object being to provide apparatus of this class which shall be comparatively simple in construction, economical in cost, reliable, durable, and efficient in use; and to these ends the invention consists of the features, arrangements, and combinations hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a side elevation of my improved ore-bucket-dumping apparatus, the carriage being shown in two positions, one position being in full lines and the other in dotted lines, and the bucket being shown in three positions, one in full lines, the second in dotted lines, and the last in broken lines. Fig. 2 is a section taken through the tracks, showing the carriage in end elevation and on a larger scale. Fig. 3 is a section taken on the line *yy*, Fig. 1. Fig. 4 is a section taken on the line *xx*, Fig. 3, looking downward. Fig. 5 is a top view of the carriage shown in position on the track. Fig. 6 is a side elevation of the bearing for a trunnion of the bucket-dumping platform shown on a larger scale. Fig. 7 is a top view of the same, the supporting-standard being shown in cross-section. Figs. 8 and 9 are fragmentary side views of the carriage, the track, and the carriage-holding dog, the parts being shown in two positions and on a larger scale. Fig. 10 is a fragmentary detail view

of the bucket and its dumping-platform. Fig. 11 is a similar view observed from a position at right angles to Fig. 10. Fig. 12 is a detail view of one of the carriage-axles and its wheels, the axle being provided with a guide-eye.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate a suitable framework erected at the mouth of a mining-shaft 6, which is indicated by dotted lines in Fig. 1. The top of this framework is composed of two separated inclined bars or beams 5<sup>a</sup>, whose lower extremities are located directly above the mining-shaft 6 and whose ascent is gradual to a point above the dump or the location where the buckets are to be emptied. To the bars 5<sup>a</sup> are secured two track-rails 7, whose lower extremities are bent upwardly, as shown at 7<sup>a</sup>, and reinforced by a brace 8 and form a stop for the carriage, which, as shown in the drawings, is composed of four wheels 9, journaled on axles 10, upon which are mounted two I-beams 12, to which are secured boxes 13 for the journals of a pulley or sheave 14, having a grooved periphery to receive the rope or cable, which is connected with the ore-bucket 16 at one extremity and the hoisting-drum 17 at the other extremity. To the central part of the lower axle of the carriage is made fast an eye 18, forming a guide for the cable, the said guide being located in the plane of the sheave 14. The cable is provided with a stop 15<sup>a</sup>, located a short distance above the bucket, the said stop being too large to pass through the guide-eye 18. To the bottom of the bucket is attached a ball 19 by means of a short chain 20. The construction of this pendant device may be varied at will, so long as it performs the function hereinafter set forth. Connected with the frame at the dumping-point are two separated standards 21, to each of which is attached a bearing 22, having a vertical slot 23 for a trunnion 24, whose extremity normally occupies a position in the bottom 23<sup>a</sup> of each slotted bearing. As shown in the drawings, these bearings are composed of angle-iron. They may, however, be of any suitable construction. Upon the two trunnions



24 is mounted and made fast a platform or plate 25, provided with a slot 25<sup>a</sup>, open at one end and closed at the other end. This device forms the bucket-dumping platform and is provided with parts extending below its axis, whereby its center of gravity is so regulated that when adjusted it will normally maintain a position with the open end of its slot toward the upwardly-moving bucket, so that the chain or pendant 20 will enter the slot. The closed extremity of the slot is located forward or to the right, referring to Fig. 1, of a vertical plane passed through the axis of the dumping-platform, so that when the bucket seats itself on the platform and is released it will tip in the direction indicated by the arrow in Fig. 1. This is essential, since a tip in the opposite direction would allow the bucket-pendant to slip out of the slot in the platform, and thus render the device inoperative.

Upon the upper part of the framework between the track bars or beams 5<sup>a</sup> is pivotally mounted, as shown at 26, a gravity-dog 27, normally resting on a cross-bar 28, located in the rear of the pivot or toward the left therefrom, referring to Figs. 1, 8, and 9. The free extremity of this dog is hook-shaped and beveled or curved, so that when the forward axle of the carriage engages it the dog will be raised to permit the hook to catch the axle. (See Fig. 9.) This occurs at the same time that the bucket-pendant reaches the forward extremity of the slot 25<sup>a</sup>. The cable is then slackened to allow the bucket to seat on the platform and dump. (See broken-line position in Fig. 1.) When in the dumped or inverted position, as shown, the bucket is suspended by the pendant 20, whose ball 19 is too large to pass through the slot 25<sup>a</sup>. Forward of its hooked extremity the dog 27 is provided with a swinging link 29 or other suitable or equivalent device. After the bucket is dumped the hoisting-drum is turned to operate the cable and bring the bucket to the erect position and also to bring the stop 15<sup>a</sup> on the cable to engagement with the guide-eye 18 of the carriage-axle. A further pull on the cable causes the carriage to move upwardly on the track until the upper axle passes above the link 29. The cable is then released or slackened to allow the carriage to move downwardly, and as the axle engages the link in its downward movement the latter swings into the notch of the hook on the dog and closes said notch, allowing the axle to pass down without engaging the hook. (See Fig. 8.)

From the foregoing description it is believed the operation of my automatic bucket-dumping mechanism will be readily understood. The cable 15 is constantly in engagement with the pulley or sheave 14. As the bucket is drawn up out of the shaft 6 the sheave 14 rotates; but the carriage does not move until the stop 15<sup>a</sup> on the cable engages the guide-eye 18. The carriage then begins to move upwardly on its track in response to

the pull of the cable which is winding on the hoisting-drum. The bucket and carriage travel upward together until the bucket-pendant enters and reaches the closed end of the slot 25<sup>a</sup> of the dumping-platform and until the hook of the dog 27 grabs the upper axle of the carriage. The cable is then slackened to allow the bucket to seat itself upon the platform (see Fig. 11 and dotted lines in Fig. 1) and dump in the direction of the arrow in Fig. 1, since the center of gravity of the bucket and the platform is at the right of a vertical plane passed longitudinally through the axis of the bucket-dumping platform.

As soon as the bucket is dumped the hoisting-drum is reversed to operate the cable and bring the bucket to the erect position and cause the stop 15<sup>a</sup> on the cable to engage the guide-eye 18 of the carriage, after which the carriage is drawn upwardly on its track until its axle passes to a position forward of the link 29 of the dog. The cable is again slackened, allowing the carriage to move downwardly, when its axle engages the link and swings it into the notch of the dog, thus preventing the axle from catching on the hook. The carriage and bucket then move down the inclined track together, maintaining the same or substantially the same relative position until the carriage reaches its lowest limit of movement, when the bucket is in the position above and ready to descend into the shaft.

Having thus described my invention, what I claim is—

1. In automatic bucket-dumping mechanism, the combination with a bucket, a cable, a framework and a track thereon, of a carriage mounted on the track, a sheave or pulley mounted on the carriage, and engaged by the cable, the arrangement being such that the bucket is raised vertically to the desired height by applying power to the cable while passing over the sheave, a stop on the cable to engage the carriage and limit the independent movement of the bucket, whereby the carriage is caused to travel up the inclined track, a pendant attached to the bucket, a pivoted platform provided with a slot adapted to receive the pendant of the bucket, the lower extremity of the pendant being enlarged to prevent it from passing through the slot, vertical guides located beneath the track and beneath its ends in which said platform is vertically movable and capable of rotation at either end and means for holding the carriage against downward movement on the track when the cable is slackened to allow the bucket to rest on the platform which is arranged to tip and dump the bucket, the latter being suspended by its pendant when in the inverted position, and means mounted on the holding means for automatically releasing the carriage as the latter is drawn upwardly whereby the carriage is allowed to move downwardly on the inclined track by gravity as the cable is slackened.

2. In automatic bucket-dumping mechanism,



ism, the combination with a bucket and cable connected therewith, of a framework provided with an inclined track, a carriage mounted on the track, a sheave journaled on the carriage, the bucket-cable passing over the sheave, a stop on the cable, arranged to engage the carriage and limit the movement of the bucket independently of the carriage, a normally balanced platform, vertical guides beneath the track and between its ends in which the platform is vertically movable and capable of rotation at either end, a pendant attached to the bucket and arranged to catch on the platform, means for holding the carriage against downward movement while the cable is slackened to allow the bucket to rest on the platform, the arrangement being such that the platform is tipped and the bucket dumped and suspended in an inverted position, and means for automatically releasing the carriage as the latter is drawn upwardly on the track whereby as the cable is subsequently slackened, the carriage and bucket will move downwardly on the track to their original position.

3. The combination with a bucket and cable, of a framework provided with an inclined track, a carriage mounted on the track, a sheave mounted on the carriage, and over which the cable passes, means for automatically locking the carriage against downward movement on the track as the cable is slackened to allow the bucket to dump, and means for releasing the carriage as the latter is drawn upwardly on the track, a tilting platform, and vertical guides between the ends of the track in which said platform is vertically movable and capable of rotation at their ends by the action of the bucket.

4. The combination with a bucket and cable, of a framework provided with an inclined track, a carriage mounted on the track, a sheave mounted on the carriage, and over which the cable passes, means for automatically locking the carriage against downward movement on the track as the cable is slackened to allow the bucket to dump, means for automatically releasing the carriage as the latter is drawn upwardly after the bucket is dumped, whereby as the cable is slackened, the carriage and bucket move downwardly together on the track, vertical guides between the ends of the track, and a tilting platform vertically movable in said guides and capable of rotation at their ends by the action of the bucket.

5. The combination with a bucket and cable, of a framework provided with an inclined track, a carriage mounted on the track, a sheave journaled on the carriage and engaged by the cable, vertical guides beneath the track and between its ends, a tilting platform vertically movable in said guides and capable of rotation at their ends by the action of the bucket, a dog mounted on the framework and arranged to automatically catch and hold the carriage while the cable is slack-

ened to allow the bucket to dump, and means for releasing the dog as the carriage is drawn upwardly on the track from the dumping position, whereby the carriage is allowed to move downwardly on the inclined track by gravity as the cable is slackened.

6. The combination with a bucket and cable, of a framework provided with a track, a carriage mounted on the track, a sheave journaled on the carriage and engaged by the cable, a pendant connected with the bucket, a pivoted dumping-platform provided with a slot which the bucket-pendant is adapted to enter as the bucket is carried along by the traveling carriage, vertical guides beneath the track and between its ends in which the platform is vertically movable and capable of rotation at its ends by the action of the bucket, the arrangement being such that as the cable is slackened the bucket engages the platform which turns on its pivot and dumps the bucket which is suspended by its pendant in an inverted position, means for locking the carriage on the track during the bucket-dumping operation, and means for releasing the carriage as the latter is drawn upwardly on the track.

7. The combination with a framework provided with an inclined track, of a bucket and cable, a traveling sheave engaged by the cable, a pivoted dumping-platform, normally balanced, vertical guides beneath the track and between its ends, in which the platform is vertically movable and capable of rotation at their ends, trunnions on which the platform is mounted, and ways in which the trunnions are arranged to slide vertically whereby the bucket and platform may move together a suitable distance, a pendant attached to the bucket and adapted to catch on the platform as the bucket travels along with the sheave, the arrangement being such that as the cable is slackened the bucket engages the platform which turns and dumps the bucket, the latter being suspended by the pendant in an inverted position.

8. The combination with a bucket and cable, of a framework provided with an inclined track, a carriage mounted on said track, a sheave mounted on the carriage and over which the cable passes, a pendant attached to the bucket, a pivoted, normally balanced dumping-platform provided with a slot which the pendant of the bucket is adapted to engage as the bucket travels along with the carriage, the length of the slot being such that as the pendant reaches its closed extremity and the cable is slackened to allow the bucket to engage the platform, the latter is tipped and the bucket dumped, trunnions on which the platform is mounted, and ways in which the trunnions are arranged to slide vertically whereby the bucket and platform move together a suitable distance.

9. The combination with a bucket and cable, of a framework provided with an inclined track, a carriage mounted on said track, a



sheave journaled in the carriage and engaged by the cable, a pendant attached to the bucket, a dumping-platform slotted to receive the pendant of the bucket, trunnions on which the platform is mounted, ways in which the trunnions are arranged to slide vertically whereby the bucket and platform may move together a suitable distance, a dog arranged to automatically lock the carriage against downward movement when the cable is slackened to allow the bucket to dump, the dog having a notch which engages a part of the carriage, a swing device attached to the dog and arranged to swing into the notch of the dog automatically when engaged by the carriage, whereby the carriage is allowed to travel downwardly on the inclined track as the cable is slackened.

10. The combination with a bucket and cable, of a frame having a track, a carriage mounted on the track and engaged by the cable, vertical guides beneath the track, and between its ends, a tilting platform vertically movable in said guides and capable of rotation at its ends by the action of the bucket, means for automatically dumping the bucket when the latter has traveled with the carriage a predetermined distance, a dog arranged to automatically lock the carriage against downward movement when the cable is slackened to allow the bucket to dump, the dog having a notch which engages a part of the carriage, and a device arranged to swing into the notch of the dog automatically when engaged by the carriage, whereby the carriage is allowed to travel downwardly on the inclined track as the cable is slackened.

11. The combination with a bucket and cable, of a track, a carriage mounted on the track and engaged by the cable and with

which the bucket travels as power is applied to the cable, a pendant attached to the bucket, a pivoted dumping-platform having a depending part adapted to maintain the platform in its normal position, trunnions on which the platform is mounted, ways in which the trunnions are arranged to slide vertically whereby the bucket and platform may move together a suitable distance, the platform being slotted to receive the bucket-pendant, and means for locking the carriage in place while the cable is slackened to allow the bucket to dump through the instrumentality of the platform.

12. The combination with a bucket and cable, of an inclined track, a carriage mounted thereon and engaged by the cable whereby the bucket travels with the carriage as power is applied to the cable, a pendant attached to the bucket, a dumping-platform having trunnions and a slot and constructed to maintain itself in position for the pendant of the bucket to enter the slot as the bucket travels with the carriage, vertical uprights beneath the track and between its ends, and ways therein in which said trunnions are vertically movable and capable of rotation at the ends thereof by the action of the bucket, and means for locking the carriage in place while the cable is slackened to allow the bucket to dump, and means for releasing the carriage as the latter is drawn upwardly, whereby as the cable is subsequently slackened, the carriage moves downwardly on the track.

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

TURY E. ANDERSON.

Witnesses:

DORA C. SHICK,  
MARY C. LAMB.