

J. J. A. MILLER.
 BUCKET OPERATED AND SUPPORTING GRIP FOR SINGLE ROPE AERIAL TRAMWAYS.
 APPLICATION FILED NOV. 2, 1909.

968,869.

Patented Aug. 30, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

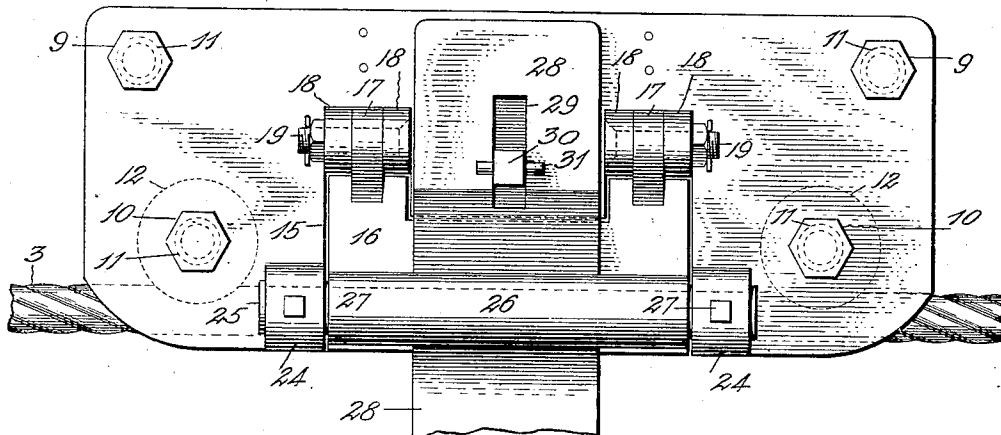


Fig. 2.

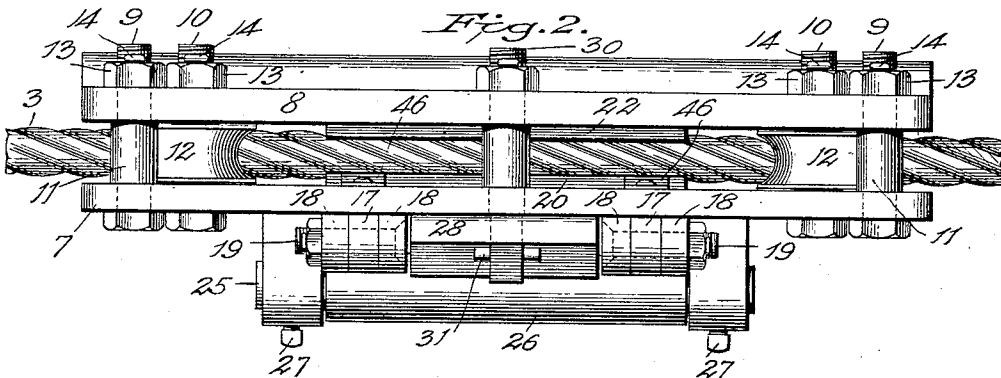


Fig. 3.

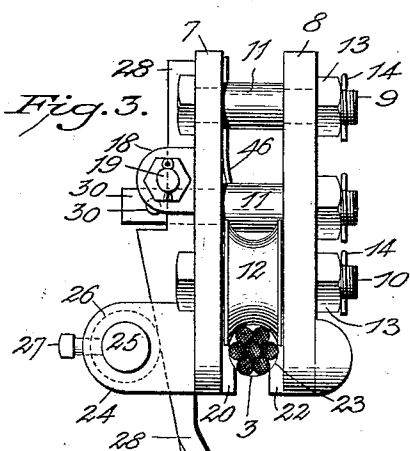
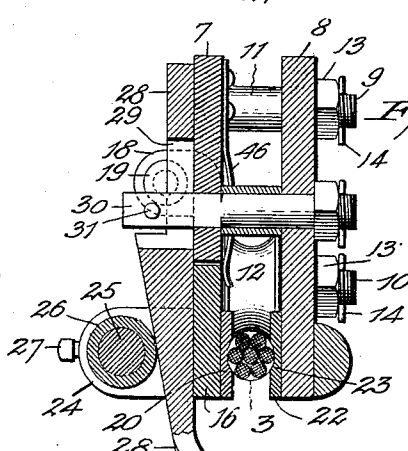


Fig. 4.



Witnesses:
 G. Sargent Elliott
 Adella M. Towle

Inventor:
 By John J. A. Miller
 H. S. Bailey, Attorney

J. J. A. MILLER.

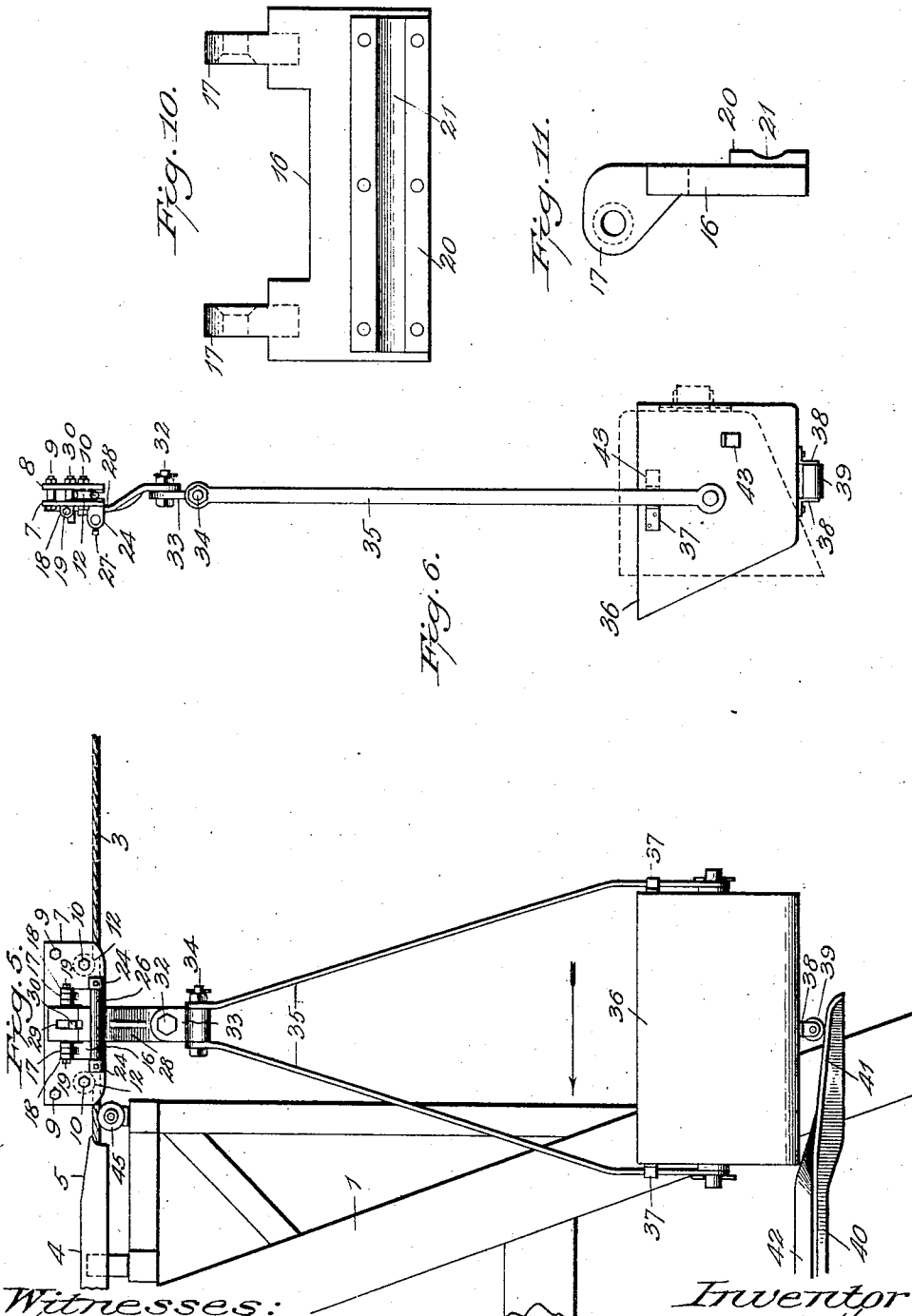
BUCKET OPERATED AND SUPPORTING GRIP FOR SINGLE ROPE AERIAL TRAMWAYS.

APPLICATION FILED NOV. 2, 1909.

968,869.

Patented Aug. 30, 1910.

3 SHEETS—SHEET 2.



Witnesses:

G. Sargent Elliott
Adella M. Dowle

By

Inventor:

John J. A. Miller.
H. S. Bailey, Attorney.

J. J. A. MILLER.

BUCKET OPERATED AND SUPPORTING GRIP FOR SINGLE ROPE AERIAL TRAMWAYS.

APPLICATION FILED NOV. 2, 1909.

Patented Aug. 30, 1910.

3 SHEETS—SHEET 3.

968,869.

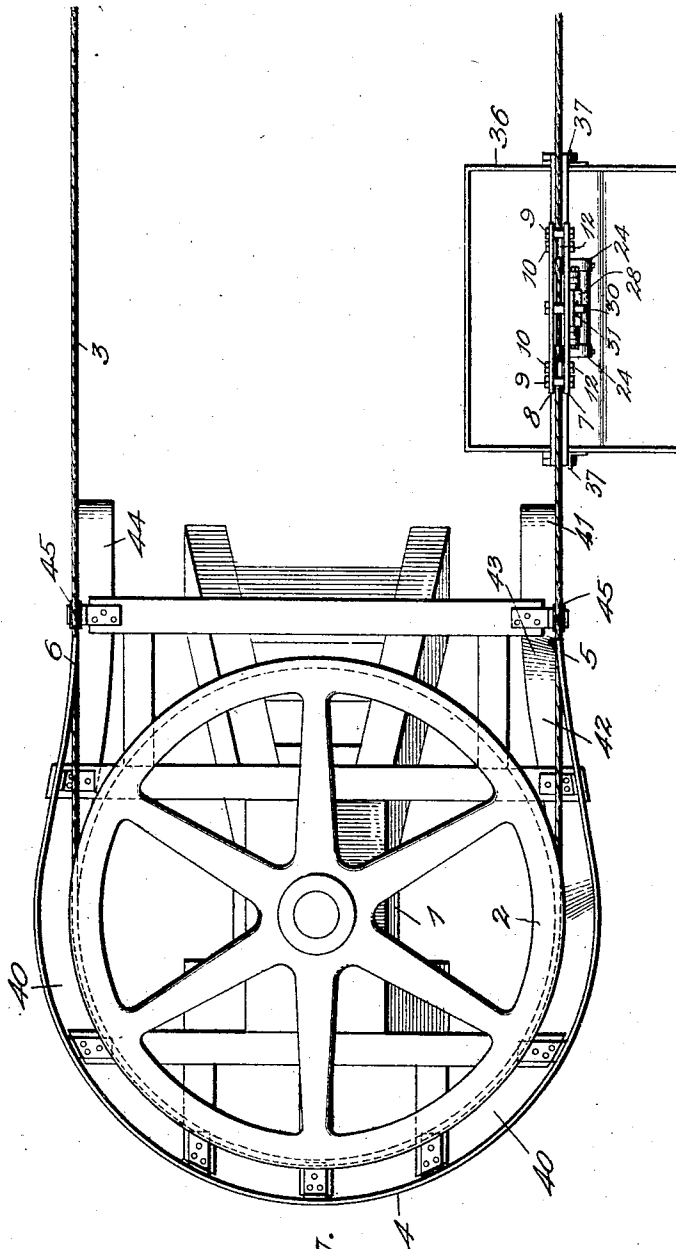


Fig. 7.

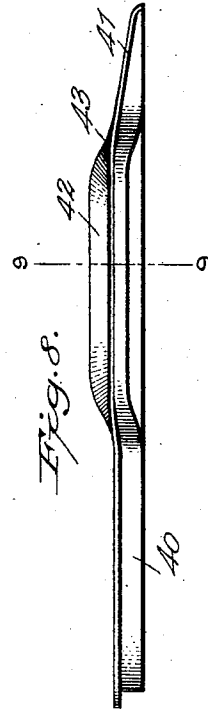


Fig. 8.



Fig. 9.

Witnesses:

L. Sargent Elliott
Adella M. Fowle

Inventor:

By John J. A. Miller.
H. S. Bailey, Attorney.

UNITED STATES PATENT OFFICE.

JOHN J. A. MILLER, OF DENVER, COLORADO.

BUCKET OPERATED AND SUPPORTING GRIP FOR SINGLE-ROPE AERIAL TRAMWAYS.

968,869.

Specification of Letters Patent.

Patented Aug. 30, 1910.

Application filed November 2, 1909. Serial No. 525,899.

To all whom it may concern:

Be it known that I, JOHN J. A. MILLER, a citizen of the United States of America, residing in the city and county of Denver and State of Colorado, have invented a new and useful Bucket Operated and Supporting Grip for Single-Rope Aerial Tramways, of which the following is a specification.

This invention relates to improvements in bucket-operated and supporting grips for single rope aerial tramways.

The primary object of the invention is to provide a grip adapted to be used in connection with a single running rope, whereby the usual stationary or track rope is dispensed with, and to this end I provide a grip consisting of a fixed jaw and a jaw that is movable relatively to the fixed jaw between which jaws the rope is adapted to be gripped, the movable jaw being clamped against the rope by a cam or wedge plate, which is drawn upon by the weight of the bucket, which is secured to and depends from said plate, the grip being supported upon the rope by rollers.

A further object of the invention is to provide means for disconnecting the grip from the rope at each terminal and for switching the same upon a stationary track concentric with the sheave wheel, around which the rope passes, this operation being effected by an inclined track adapted to receive the weight of the bucket and thereby release the grip, which is guided on to the stationary track, the said inclined track being also arranged to tilt the bucket and dump the same.

These objects are accomplished by the mechanism illustrated in the accompanying drawings, in which:

Figure 1 is a front elevation of the improved grip, showing the same gripped to a section of rope. Fig. 2 is a plan view of the same. Fig. 3 is an end view thereof. Fig. 4 is a central, vertical, transverse, sectional view of the same. Fig. 5 is a front view of a bucket and grip supported upon the running rope, the bucket being in engagement with an inclined track, which takes the weight of the same and thereby releases the grip. Fig. 6 is an end view of the bucket and grip. Fig. 7 is a plan view of one of the terminals, showing a bucket about to pass from the running rope onto the stationary track. Fig. 8 is a front view of the combined grip releasing and bucket dump-

ing track. Fig. 9 is a transverse, sectional view thereof on the line 9—9 of Fig. 8. Fig. 10 is a rear view of the movable rope gripping plate showing a shoe secured thereto; and Fig. 11 is an end view thereof.

Referring to the accompanying drawings: the numeral 1 indicates a supporting structure of any required design, which forms one of the terminals of the tramway, and upon this structure is mounted a sheave wheel 2, around which the running or traction rope 3 passes. Concentric with the sheave wheel 2, and a suitable distance from it, is supported a semi-circular stationary track 4, the free ends 5 and 6 of which curve gradually toward and lie immediately above the parallel runs of the rope at a short distance from the wheel. The tread of the semi-circular portion of this track lies slightly above the plane of the rope groove in the wheel, and its ends 5 and 6 incline downward to the rope. At the opposite terminal the rope passes around a sheave wheel similar to the wheel 2, and is supported at intervals between the terminals, in the usual manner, and in this style of tramway the stationary or track rope is dispensed with and the running rope only employed.

The improved clip illustrated in the drawings and which is designed to be used in connection with a single rope tramway comprises a pair of plates 7 and 8, which are connected by bolts 9 and 10, spacing sleeves 11 being placed upon the bolts to hold the plates a suitable distance apart, the ends of the sleeves forming shoulders against which the plates bear, as will be understood. Upon the sleeves of the two lower bolts 10 are mounted grooved rollers 12, which normally rest upon the rope and help support the weight of the bucket, but when the clip is switched off upon the stationary track these rollers act as trolley wheels and support the entire weight of the bucket and enable it to be rolled around the track and on to the rope again, as will hereinafter fully appear. The bolts 9 and 10 are secured by nuts 13, which are retained upon the bolts by cotter-pins 14.

The plate 7 is formed with a central recess 15, which extends in a suitable distance from its lower edge, and in this recess is loosely fitted a plate 16, the upper edge of which is provided with apertured ears 17, each of which lies between a pair of apertured ears 18, which may be secured to the plate 7, but

which are shown as being integrally connected therewith. Bolts 19 pass through these ears and pivotally support the plate 16. The head of each bolt is preferably countersunk in one of the ears 18, and they are secured by nuts and cotter-pins, as shown. Upon the rear side of the plate 16 is secured a shoe 20, having a longitudinal, semi-circular groove 21, and a similar shoe 22 having a groove 23 is secured to the plate 8, diametrically opposite to the shoe 20. The shoe 20 is adapted to clamp the rope between it and the shoe 22, as will presently be fully shown. Apertured lugs 24 project from the bottom of the plate 7, one on each side of the recess 15, and these lugs support a circular bar 25, upon which is mounted a tubular roller or sleeve 26, the bar being held in the lug aperture by set screws 27.

20 A wedge plate 28 is placed between the roller 26 and the plate 16, said plate being formed with a vertically disposed rear side, which lies against the plate 16, and with an inclined front side which is adapted to contact with the roller 26, whereby when the lower end of the wedge is drawn upon the plate 16 is forced inward against the rope. The portion of the plate 28 above the head of the wedge is reduced in thickness, as shown in Figs. 3 and 4, and is provided centrally with a slot 29, through which the squared portion of a bolt 30 passes, which bolt also extends through the plates 7 and 8, and is secured by a nut and pin as shown.

35 A pin 31 passes through the squared portion of the bolt 30 a sufficient distance from the plate 28 to permit the same to have a limited outward rocking movement, and the squared end of this bolt prevents wobbling of the plate. The portion of the wedge plate below the plate 7 inclines inward to a point in vertical line with the rope 3, and then terminates in a vertical, apertured end, through which a bolt 32 passes, upon which is pivotally supported a hanger 33, through the lower end of which passes a bolt 34 at right angles to the bolt 32, which bolt 34 also passes through the upper ends of the bails 35, which are secured at their lower ends to a bucket 36. By bending the end of the plate 28 so as to stand in line with the rope, the center of gravity of the bucket, which is suspended from said bent end, is also in vertical line with the rope, and the clip is thus supported upon the rope in an upright position. The bolt 32 permits the bucket to swing in a line parallel with the rope, while the bolt 34 permits a swinging movement at right angles to the rope, and thus the grip is relieved of all twisting or straining movement while clamped upon the rope.

The pivotal axis of the bucket is slightly on one side of its vertical center and slightly above its horizontal center. By pivoting the

bucket in this manner, the preponderance of weight is on one side, and in the present instance this is the rear side. The bucket when loaded would thus have a tendency to tip toward the rear or inward and to counteract this stops 37 are secured to the ends of the bucket in position to engage the bails when the bucket is on an even keel, and thus prevent the same from dumping inward. Thus, whether the bucket is empty or loaded, it will assume the position shown in Fig. 6, and after dumping it will return to this position by gravity. The dumping of the bucket and the releasing of the grip as the bucket reaches the terminal are both effected automatically and in the following manner: Upon the bottom of the bucket are secured suitable journal bearings 38, in which is mounted a roller 39, which is of sufficient length to present a broad bearing surface, and this roller is adapted to engage and ride upon a combined bucket lifting and dumping track 40 at the entrance of the terminal, which track is arranged in the path of the said roller, and is supported in any suitable manner. The forward end or bucket lifting portion 41 of this track is far enough in advance of the switch end 5 of the track 4 to be engaged by the roller 39 before the grip reaches the end 5 of the said track 4. The end 41 inclines upward, and as the roller rides up this incline the bucket is thereby lifted and the wedge plate is raised, releasing the pressure on the gripping plate 16, so that when the grip reaches the switch 5 it is already released from the rope and is carried up the inclined face of the said switch by the momentum of the bucket and on to the track 4.

The face of the inclined end 41 of the track is on a horizontal plane transversely of its direction, and at the point of junction of the inclined end with the bucket dumping portion 42 of the track a substantially spiral twist 43 is given to the track, which tilts the face of the said dumping portion at an angle of substantially forty-five degrees. As the roller reaches this twist, it is gradually turned from its normal horizontal position to a position conforming to the angle of the face of the dumping portion of the track, and as it turns the bucket is thereby tilted, thus shifting its center of gravity to the front side, which causes the bucket to dump automatically, and after dumping it returns to its normal position by gravity. In dumping the bucket is prevented from turning completely over by stops 43 secured upon its ends, which engage the bails of the bucket when the bucket reaches the position shown in dotted lines, Fig. 6. The thickness of the track 4 is considerably less than the diameter of the rope, so that it will not be engaged by the gripping jaws, and thus the rollers 12 are permitted to ride freely there-

on, as the bucket is moved around the terminal. The track 40, however, is extended around the terminal, in order that the roller 39 may ride thereon and take the weight of the bucket from the wedge plate 28, so that the grip will be open when it passes from the switch end 6 onto the rope, and as the roller 39 passes off from the inclined end 44 of the track 40 the weight of the bucket again causes the wedge plate to lock the grip upon the rope. The rope is supported adjacent to the switches 5 and 6 by rollers 45, in order that it may be prevented from sagging at these points and thus interfere with the switching of the grip.

In operation, one of the sheave wheels is connected with a source of power in any suitable manner, whereby the rope 3 is set in motion. The buckets are then placed upon the rope at intervals by first hanging them upon the stationary track and then rolling them onto the rope, which is instantly gripped as the wedge plate 28 is drawn down by the weight of the bucket. The terminals, one of which is termed the loading terminal and the other the dumping terminal, are each equipped in the same manner, that is, with a sheave wheel, a stationary switch track concentric with and slightly above the plane of the sheave wheel, and a combined bucket-lifting and supporting track, which is arranged in the path of the bucket roller. The buckets are loaded at the loading terminal, and on the stationary switch-track, after which they are moved, either manually or by suitable mechanism, onto the rope, which carries them to the dumping terminal. As each bucket approaches this terminal, its roller 39 engages the inclined track 41, and the momentum of the bucket carries it up this track which now supports it, and thus relieves the rope of its weight. The pull on the wedge plate 28 is not only relieved, but the said plate is pushed up by its connection with the bails as the bucket rises on the inclined track 41, so that the pressure on the hinged grip plate 16 is removed and the grip is opened and is then supported solely by the rollers 12. Thus, by the time the grip reaches the point of the switch 5, it has been released from the rope, and the momentum of the bucket is sufficient to carry the said grip up the inclined switch 5, and on to the stationary track. The lower corners of the plates 7 and 8 are curved as shown so as to offer no obstruction when the grip is switched from the rope to the track and back again to the rope. When the roller 39 encounters the spiral twist 43, the bucket is careened sufficiently to shift its center of gravity and the bucket dumps automatically and immediately thereafter rights itself by gravity. The remainder of the track 40 around to the switch 6 is on a horizontal plane, but the dis-

tance from the plane of this track to the plane of the track 4 is slightly less than the distance from the tread of the rollers 12 to the bottom of the roller 39, so that the track 40 carries the weight of the bucket, leaving the grip free to engage the rope as it passes on to the same from the switch 6. Springs 46 exert an outward pressure upon the grip plate 16, so that when it is released by the wedge the said springs move it out of contact with the rope.

Having described the invention, what I claim as new and desire to secure by Letters Patent is:

1. In a bucket supporting grip for single rope tramways, the combination with a traction rope of plates, and rollers journaled between said plates adapted to rest upon said rope, a gripping member hinged to one of said plates and adapted to act in conjunction with the other plate to grip the rope, an abutment in line with the hinged gripping member, a wedge block between said abutment and hinged member having a depending end which is bent to lie in a vertical line with the rope and a bucket the bails of which are pivotally connected with said depending end.

2. In a bucket supporting grip for single rope tramways, the combination with a traction rope of parallel plates and rollers journaled between said plates and adapted to rest upon the rope, one of said plates being recessed in from its bottom edge, apertured ears upon the plate at the upper end of the recess, apertured lugs on the plate on opposite sides of the recess, and a roller supported by said lugs, a gripping member in said recess having apertured ears which are pivotally connected to the ears upon the plate, a wedge block interposed between the roller and the gripping member, which is adapted to press the latter against the said rope, said wedge block having a depending end in vertical line with the rope and a bucket pivotally connected to the said depending end.

3. In a bucket supporting grip for single rope tramways, the combination with a traction rope of plates and rollers journaled between said plates adapted to rest upon the rope, a gripping jaw hinged to one of said plates and adapted to act in conjunction with the other plate to grip the rope, an abutment in line with the gripping jaw, a wedge block between the abutment and the gripping jaw, having a depending end in vertical line with the rope, a bucket pivotally connected to said depending end, means arranged in the path of the bucket to receive the weight of the same and thus release the grip from the rope.

4. In a bucket supporting grip for single rope tramways, the combination with a traction rope of a grip mounted thereon com-

prising supporting plates, and rollers journaled between said plates, which are adapted to rest upon the rope, a hinged jaw adapted to act in conjunction with one of the plates to grip the rope, a wedge for operating the jaw, a bucket depending from said wedge, a roller on the bottom of said bucket, and an inclined track in the path of said roller which is adapted to receive the weight of the bucket and thereby release the said grip by relieving the pull on the wedge.

5. In a bucket supporting grip for single rope tramways, the combination with a traction rope of plates having rollers journaled between them, which are adapted to rest upon the rope, a gripping jaw hinged to one of said plates and adapted to act in conjunction with the other plate to grip the rope and shoes on said jaw and plate, a roller mounted on the same plate with the jaw and in line with the same, a wedge interposed between the roller and the jaw, having a vertical slot, a bolt rectangular in cross section which extends through said slot and is secured to the plates, a bucket suspended from the wedge, a roller on the bottom of the bucket, an inclined track in the path of the roller adapted to receive the weight of the bucket as it is carried up said track by its momentum and thereby release the grip, and a stationary switch track which overlaps the traction rope at the point where it is released by the grip to receive the said grip.

6. In a bucket supporting grip for single rope tramways, the combination with a terminal sheave, a traction rope on said sheave and a stationary track concentric with the sheave wheel having switch ends which overlie the said rope, of a grip on said rope comprising supporting plates, a gripping jaw hinged to one of said plates and adapted to act in conjunction with the other plate to grip the rope, an operating wedge in contact with the jaw, a bucket suspended from the wedge having a roller, an inclined track in the path of the roller adapted to receive the weight of the bucket and thereby release the grip as the same reaches the switch end of the concentric track, whereby the grip is switched on to said track by the momentum of the bucket.

7. In a bucket supporting grip for single rope tramways, the combination with a terminal sheave wheel, a traction rope around said wheel and a switch track concentric with said wheel, the ends of which overlie said rope of a grip comprising plates, rollers journaled between said plates which are

adapted to rest upon the rope, a gripping jaw hinged to one of said plates and adapted to act in conjunction with the opposite plate to grip the rope, a bucket, an operating device connected with the bucket and with the gripping jaw which exerts a pressure on said jaw under the weight of the bucket, a roller on the bucket, a track in the path of the roller adapted to receive the weight of the bucket and thereby release the grip as the same approaches the end of the switchtrack, whereby the grip is carried onto the switchtrack by the momentum of the bucket.

8. In a bucket supporting grip for single rope tramways, the combination with a terminal sheave wheel, a traction rope surrounding said wheel, a switch track concentric with the wheel, the free ends of which overlie the rope, a gripping device supported on said rope having a fixed member, and a hinged member adapted to act in conjunction with the fixed member to clamp the rope, a bucket and a pressure device connected with the hinged member and bucket whereby the weight of said bucket operates the said pressure device, of means for releasing the grip comprising a track concentric with the switch track having downwardly inclined free ends, a roller on the bucket in the path of said track, which rides upon the same as the bucket approaches the terminal wheel, the said track receiving the weight of the bucket thereby relieving the pressure device and releasing the grip which is moved on to the switch track by the momentum of the bucket.

9. In a bucket supporting grip for single rope tramways, the combination with a traction rope of a gripping device on said rope having a fixed member and a member movable relative thereto adapted to act in conjunction with the fixed member to clamp the rope, of a pressure device in connection with the movable member, a bucket suspended from the pressure device whose weight is adapted to operate said device, and means for releasing said grip comprising a roller on said bucket, a track in the path of the roller adapted to receive the weight of the bucket, said track being provided with an inclined face which is engaged by the roller whereby the bucket is tipped.

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

JOHN J. A. MILLER.

Witnesses:

G. SARGENT ELLIOTT,
ADELLA M. FOWLE.