

No. 742,236.

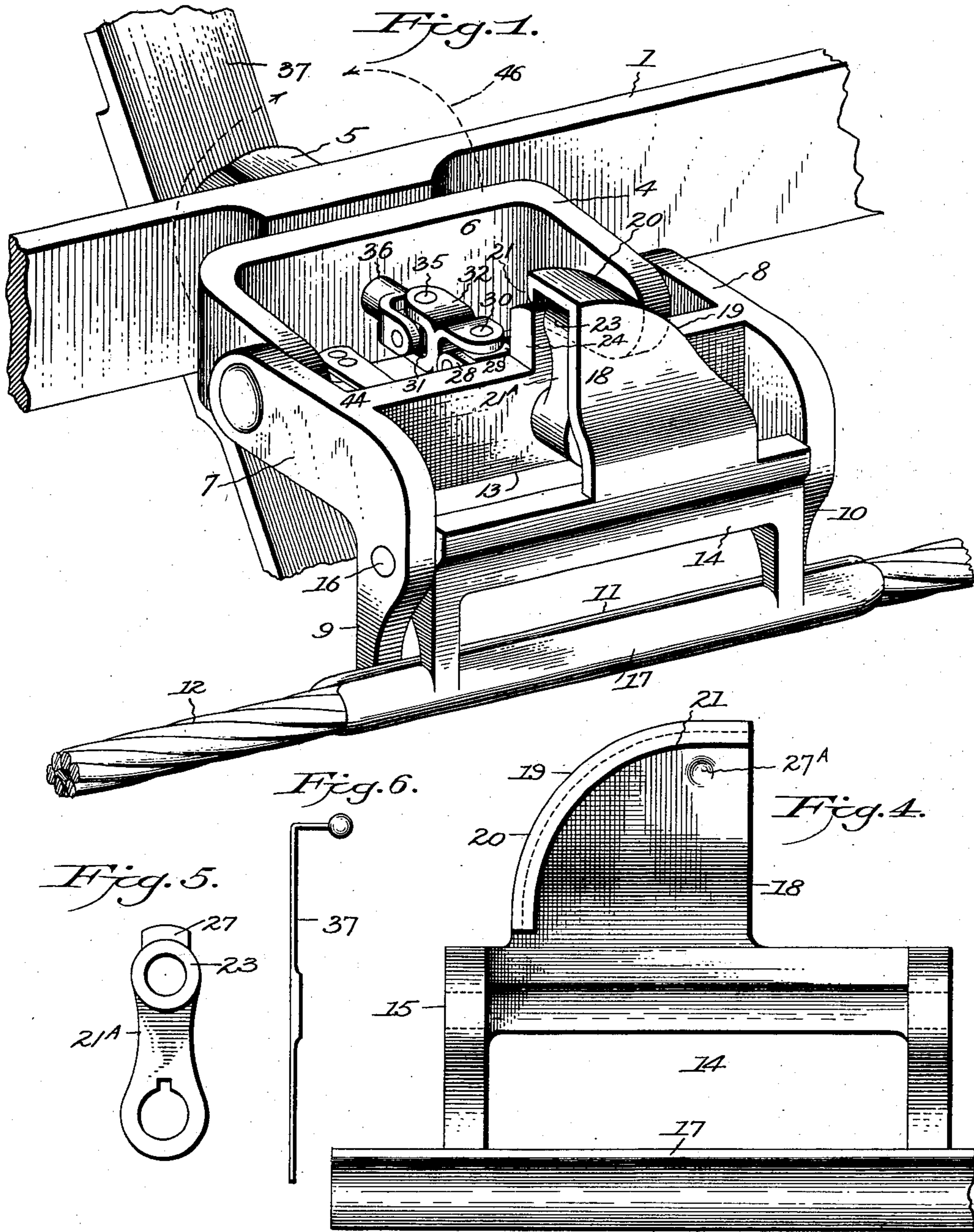
PATENTED OCT. 27, 1903.

B. C. RIBLET.  
GRIP FOR AERIAL WIRE ROPE TRAMWAYS.

APPLICATION FILED MAR. 4, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:  
G. Sargent Elliott.

Joseph Wilkinson

By *Byron C. Riblet.*  
H. S. Bailey Attorney.

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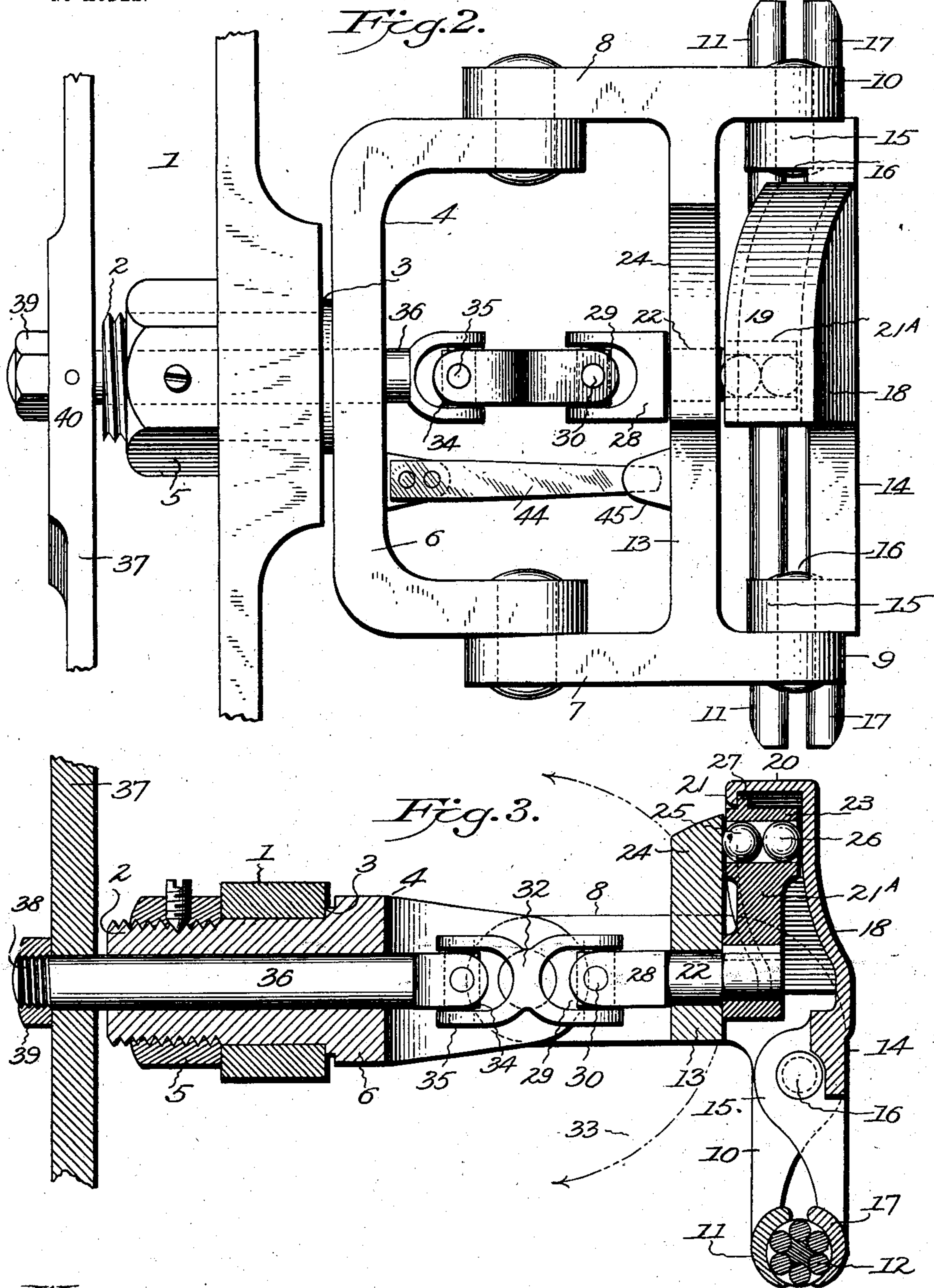
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Witnesses:

G. Sargent Elliott.  
Joseph Mikulicow

Inventor:

By Byron C Riblet  
H. S. Bailey. Attorney.

# UNITED STATES PATENT OFFICE.

BYRON C. RIBLET, OF SPOKANE, WASHINGTON.

## GRIP FOR AERIAL WIRE-ROPE TRAMWAYS.

SPECIFICATION forming part of Letters Patent No. 742,236, dated October 27, 1903.

Application filed March 4, 1903. Serial No. 146,112. (No model.)

*To all whom it may concern:*

Be it known that I, BYRON C. RIBLET, a citizen of the United States of America, residing at Spokane, in the county of Spokane and State of Washington, have invented certain new and useful Improvements in Grips for Aerial Wire-Rope Tramways; 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 grips for aerial wire-rope tramways; and the objects of my invention are, first, to provide a friction-grip adapted to be attached to a bucket for gripping and releasing the traction-rope of the double-rope system of aerial wire-rope tramways at any predetermined point of its terminal ends at any part of a tramway-line intermediate of its terminal ends; second, to provide a friction-grip that will move in vertical and longitudinal planes relative to the lay of the rope; third, to provide a strong, durable, and simple friction-grip that can be applied to any of the double-rope systems of wire-rope tramways in use. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of my improved friction-grip. Fig. 2 is a plan view of Fig. 1. Fig. 3 is a section of Fig. 2 on line 3 3, showing the actuating-rods in side elevation. Fig. 4 is a fragmentary view of the movable jaw. Fig. 5 is a side elevation of the crank-arm that actuates the cam of the movable jaw, and Fig. 6 is an elevation of the actuating-lever.

Similar numerals of reference refer to similar parts throughout the several views.

Referring to the drawings, the numeral 1 designates the cross-bar of the pendant of a bucket or carrier of a wire-rope tramway. In this cross-bar I form a hole, through which I pass a bolt 2 against a shoulder 3, formed on the bolt. This bolt forms an integral part of a yoke 4. The end of the bolt 2 is threaded and is provided with a nut 5, which is turned

to the end of the thread and bears loosely but closely against the adjacent side of the cross-bar, and thus pivotally secures the yoke between the nut and shoulder of the bolt to the cross-bar. The back 6 of the yoke lies close to the cross-bar, and its free ends extend laterally from it. This yoke I term the "pivotal" supporting member of the grip. To the free ends of the yoke I pivotally secure the ends of two right-angled arms 7 and 8, that form a right-angled clip rope-grip, the opposite ends 9 and 10 of which form an integral part of a jaw 11, which extends parallel with the back of the yoke and cross-bar and from one arm to the other arm and preferably beyond the arms 7 and 8 at each end. This jaw 11 is a fixed jaw. It is of semicircular form and is adapted to partially surround the traction-rope 12. The angled grip-arms 7 and 8 are integrally connected together at a short distance from their ends by a cross-bar 13. The angled arms, the cross-bar, and the fixed jaw together I term the "fixed" jaw of the grip.

At a short distance above the fixed jaw of the angled levers 7 and 8 I pivotally secure a movable jaw 14. This movable jaw comprises a block 15, through which a pin 16 extends into apertures formed in the clip-arms 7 and 8. From this block two arms depend, one at each end, which are integrally connected at their lower ends to a semicircular jaw 17, which is arranged to register opposite the fixed jaw 11. The movable jaw is also of semicircular form and is adapted to fit partially over the traction-rope 12 and is of the same length as the fixed jaw. A standard 18, which forms an integral part of the block, projects upward from it. One edge of this standard, as illustrated, is substantially vertical to the top edge of the block, and the opposite edge curves in a quadrant of a circle 19 from the top of the standard down to the top of the block. From the top and curved edge of the standard a lateral hood 20 is formed, which is provided with an introverted lip 21. The sides of this standard are curved inward toward the yoke from the top of the block to the top of the standard, and the edge of the hood and the introverted lip at its edge are curved parallel with the inner side of the

standard. This standard forms a fixed vertical curved inclined quadrant-shaped cam and the introverted lip a cam-lip, which is located on the opposite end of the movable jaw from its rope-gripping end, and this cam is actuated to cause the jaw to grip the rope by a crank-arm 21<sup>A</sup>, which is secured to the end of a round rod 22, that extends rotatably through the cross-bar 13 of the clip. The head end 23 of the crank-arm is formed to fit with its outer end close to but loosely between the inwardly and upwardly curved inner surface of the standard, which is the cam-surface, and a vertical abutment 24, that forms an integral portion of the cross-bar of the clip and angled grip. This abutment in outline is also in the form of a quadrant of a circle, but is of just enough smaller radius, so that when the quadrant tips toward it the hood and the introverted lip will pass over its top edge. The face of the abutment is preferably made vertical. While I could make the head end of the crank-arm fit slidingly between the cam-surface and the abutment, arranging and adapting it so that its two opposite ends and the lug would form three sliding surfaces between the cam-surface and introverted cam-lip and the abutment at its top end, I preferably provide a ball or roller bearing that will project slightly from each end of the head of the crank-arm and will bear and roll against the cam and abutment, leaving the lug to move the movable jaw on its jaw and rope releasing movement. I preferably carry out this feature of my invention in the following manner: Through the head of the crank-arm I form a hole, arranging it at right angles to the quadrant-cam. In this hole I place two hardened-steel balls 25 and 26. I make the hole large enough to receive two balls large enough in diameter to touch each other and at the same time extend beyond the sides of the head of the crank-arm and bear against the cam and abutment. The head of the end of the crank-arm is provided with a projecting lug 27, which is positioned on the crank-arm to bear slidingly against the inner surface of the introverted lip of the hood, so that as the crank-arm is turned downward through the quadrant-cam it will push against the lip and move the top of the cam toward the yoke, and thus open the movable jaw and release the jaws and the grip from the rope, and when the crank-arm is turned upward from a horizontal to a vertical position its ball-bearing rolls against the face of the inwardly-curved vertical cam and the abutment and forces the cam outward and the movable jaw inward against the rope, thus gripping the rope between itself and the fixed jaw. This quadrant-shaped vertically-inclined cam gives great power to the rope-gripping jaws, as it passes power from two sources—first, the inclined curved wedge shape of the cam, and, second, from the fact that the greatest pressure exerted by the

crank-arm on the cam is at the farthest point from the jaw on the cam and in the operating movement of the crank-arm. At the top of the cam a recess 27<sup>A</sup> is formed, into which the adjacent ball fits and locks the crank-arm in a vertical position against accidental displacement. The opposite end of the rod 22 is provided with a slotted end 28, in which is pivotally secured a block 29, that is provided with trunnion-pins 30 on each of its sides. (See Fig. 2.) This block is pivotally secured by these trunnion-pins to one end of a link 32, thus enabling the rope-gripping jaws and the traction-rope to swing in a vertical plane on the pivotal pins of the yoke up and down through the arc of about one-half of a circle, as shown by the dotted line 33 in Fig. 3. The opposite end of the link 32 is also pivotally secured to a block 34, which is also provided on each of its four sides by pins 35, that pass through the ends of said link and also through the ends of a slotted rod 36, that passes through and beyond the back of the yoke and its stem 2, (see Fig. 2,) thus forming a universal joint between the links and the ends of the rods 22 and 36. Upon the opposite end of the rod 36 I secure a lever 37 by a thread 38 and nut 39, placed on the end of the rod, and a pin 40, which I insert through the lever 38 and the rod 36. The lever 37 is the grip-actuating lever, and I preferably secure it to the actuating-rods 22 and 36 of the grip at about the center of its length. The top end of the rod is provided with an overbalancing weighted end, which is adapted to normally hold the crank-arm and the movable jaw in operative rope-gripping position. This actuating-lever is adapted to be engaged at either one of its ends by an obstructing arm or bracket or lever placed in its path at the terminals of the tramway-line or at any intermediate point in its length where it is desired to grip or release the traction-rope from the bucket. The grip-jaw is pivotally secured to the yoke in order that they may swing in a vertical plane, as indicated by the dotted line 33, and thus accommodate itself to the rise and fall of the traction-rope. The angled grip-jaws have a vertical movement of a little less than one-half of a full semi-circle.

The right-angled form of the supporting-body of the fixed jaw and its pivotal connection with the yoke permits me to place sheaves to run the traction-rope either under or over vertical and horizontally positioned sheaves along a tram-line.

In order to normally hold the grip-jaws in a horizontal position, I secure one end of a spring 44 to each side of the yoke and extend it close to the cross-bar of the angled levers of the fixed jaw, on which is formed a projecting lug 45, which rests on the spring. These springs 44 simply support the weight of the jaws, so that they will not swing down, but will be held normally in the horizontal

and vertical position shown in Fig. 3, in which position they are in gripping relation to the traction-rope. In addition to the vertical movement of the jaws they and the yoke pivot on the stem 2 in the cross-bar of the bucket in the direction of the lay of the traction-rope, as shown by the dotted line 4 6, which allows the grip to adjust itself to steep inclines in the traction-ropes where the buckets would hang vertically.

The operation is as follows: The operating-lever is turned either by an attendant or by a projecting arm placed in the moving path of the lever in such a manner that it will move it to move the movable jaw to grip the rope, and the jaws are released by the operating-levers being moved in an opposite direction in a similar manner. The position of the jaws in the substantially circumferential arc of their vertical movement is immaterial, as the universal joint permits the operative lever to operate the crank-arm in any position. It is not generally necessary to grip or release the traction-rope except at the terminals of a tram-line or at the junction of some branch line with a main tram-line, and at such points the traction-rope and the grip will stand substantially as shown in Figs. 1, 2, and 3, and consequently the gripping and releasing of the traction-rope will take place when the rods and universal joint are in substantially a horizontal plane.

My invention is very simple, durable, and will adjust itself to vertically-inclined tracks and horizontal curves in tram-lines.

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

1. In a friction-grip for wire-rope tramways, the combination with the supporting cross-bar of a bolt pivotally secured to said cross-bar, a yoke-shaped plate projecting from one end of said bolt, and an angled jaw-body pivotally secured to the ends of said yoke, substantially as described.

2. In a friction-grip for wire-rope tramways, the combination with a suitable bucket-attaching support for a rope-grip, of a yoke-shaped member provided with a bolt extension pivoted to said support to swing vertically transversely of its pivotal support, an angled lever member pivoted to said yoke member to swing vertically and axially with said bolt extension of said yoke, a fixed jaw at the free end of said angled lever, a movable jaw pivotally secured to said angled jaw member, means including an operating-lever for operating said movable jaw to grip a rope between itself and the said fixed jaw, and means including a spring for normally holding said jaws at right angles to said yoke member when released from said rope, substantially as described.

3. In a friction-grip for wire-rope tramways, the combination with a suitable grip-support for tramway-buckets, of a yoke pivotally se-

cured to said support, a rod pivotally mounted in said yoke, an operative lever secured to one end of said rod, of a fixed jaw having a right-angled body portion pivotally secured to said yoke, a movable jaw pivotally secured to the right-angled body of said fixed jaw to register opposite said fixed jaw, a cam on said movable jaw, and means including a lever mounted on one end of said rod for actuating said cam to operate said jaws to grip a rope, substantially as described.

4. In a friction-grip for wire-rope tramways, the combination with the cross-bar of the yoke having a projecting bolt pivotally secured in said cross-bar, a fixed jaw having an angled body portion pivotally secured to said yoke, a movable jaw pivotally secured to said fixed jaw's angled body portion to register opposite said fixed jaw, a cam on said movable jaw, a rod pivotally secured in said yoke and bolt, an operative lever at the outer end of said arm, and means including a crank-arm connected to said rod and operative lever for actuating said cam to cause said jaws to grip or release a rope between them, substantially as described.

5. In a friction-grip for wire-rope tramways, the combination of the cross-bar, with the yoke pivotally mounted therein, a rod pivotally mounted in said yoke, an operative lever secured on one end of said rod, a link pivotally secured to the opposite end of said rod to swing in a horizontal and vertical direction, a right-angular-shaped fixed jaw pivotally secured to said yoke-plate, a movable jaw pivotally secured to said fixed jaw to register with it and arranged and adapted to grip a rope between it and said fixed jaw, a cam on said movable jaw, a rod pivotally mounted in said angled jaw, and means including a crank-arm secured to one end of said rod and arranged in operative relation to said cam for actuating said cam to cause said jaws to grip a rope between them, substantially as described.

6. In a friction-grip for wire-rope tramways, the combination with the cross-bar of a yoke-shaped plate pivotally secured to said cross-bar, an aperture in said yoke, a rod rotatably mounted in said yoke and an operative lever secured to one end of said rod, substantially as described.

7. In a friction-grip for wire-rope tramways, the combination with the cross-bar of a yoke-shaped plate provided with a bolt extension pivotally secured to said cross-bar, an aperture axially through said yoke and its bolt extension, a rotatable rod extending through said aperture, an operative lever secured to the outer end of said rod, a universal joint secured to the inner end of said rod, a right-angular-shaped fixed jaw pivotally secured to said yoke, a movable jaw pivotally secured to said angled jaw and means connected with said movable jaw and including said operating lever and rod for actuating said movable

jaw to grip and release a rope between it and said fixed jaw, substantially as described.

8. In a friction-grip for wire-rope tramways, the combination with the cross-bar, the yoke 5 pivotally mounted in said cross-bar and the operating lever and rod extending rotatably through said yoke, of a fixed and a movable jaw operatively arranged and adapted at the depending end of a right-angled-shaped 10 supporting-body portion having its opposite end pivotally secured to said yoke, and means including said operating lever and rod for operating said jaws to grip or release a rope between them, substantially as described.

9. In a friction-grip for wire-rope tramways, the combination with the cross-bar, the yoke, the operating lever and rod, and the right-angled fixed jaw, of the movable jaw pivotally secured thereto, and means including 20 said operating lever and rod for actuating said movable jaw to grip a rope between it and said fixed jaw, substantially as described.

10. In a friction-grip for wire-rope tramways, the combination with the cross-bar, the 25 yoke, the operating-lever and its operating-rod, the right-angular-shaped fixed-lever member pivotally secured to said yoke, and the fixed jaw at the depending end of said angled jaw-lever member, of a movable jaw 30 pivotally secured to said angled lever member comprising a bar, a jaw depending from said bar and arranged to register opposite said fixed jaw, a quadrant-shaped projection on said bar opposite from said jaw, a laterally- 35 extending flange or edge on the quadrant edge of said projection, and an introverted lip on said flange, a vertically and inwardly inclined cam-face on the side of said quadrant-shaped projection inclining toward said 40 yoke, a crank-arm pivotally secured in said angled jaw-lever member and arranged to bear in against said cam-face and provided with a projecting lug adapted and arranged to engage the inside of said introverted lip 45 of said flange, means including a universal-joint connection between said crank-arm and said operating lever and rod for actuating said crank-arm to engage said cam to move said movable jaw to grip a rope between itself 50 and said fixed jaw, and means including a spring for normally holding said jaws when released from a rope at right angles to the axial support of said yoke, substantially as described.

11. In a friction-grip for wire-rope tramways, the combination with the cross-bar and the yoke pivotally mounted therein, of the angled jaw pivotally secured to said yoke, the rod extending rotatively through said yoke, 60 the operating-lever secured to said rod, the movable jaw pivotally secured to said angled jaw, the quadrant-cam on said movable jaw, the rod pivotally secured to said angled jaw, the universal joint arranged to connect the 65 ends of said rods, an arm on the end of said rod arranged to bear against the face of said

cam, a hood extending over the operative path of said crank-arm, a projection on said arm and an introverted lip on said cam arranged to be engaged by said arm through- 70 out its operative movement, substantially as described.

12. In a friction-grip for wire-rope tramways, the combination with the yoke, the operating lever and rod, and the right-angular-shaped fixed jaw, of a movable jaw pivotally 75 secured intermediate of its ends to said fixed jaw, a jaw at one end of said movable jaw, an inclined cam at its opposite end, an abutment on said fixed jaw registering with said 80 cam, a crank-arm comprising a rod and a crank pivotally mounted in said fixed jaw, having its crank end positioned between said cam and said abutment, a suitable universal joint connecting one end of said crank-arm to 85 said operating rod and lever and a ball or roller bearing operatively secured to the crank end of said crank-arm and adapted to operatively bear against said cam and abutment to move said movable jaw to grip a rope 90 between itself and said fixed jaw, substantially as described.

13. In a friction-grip for wire-rope tramways, the combination of the yoke and operating lever and rod, the angled fixed jaw, the 95 abutment on said fixed jaw, the movable jaw pivoted to said fixed jaw having a cam at one end and positioned to register opposite said abutment of said fixed jaw, and a jaw at its opposite end, with the crank-arm pivotally 100 secured to said fixed jaw and having its crank arranged to swing between said cam of said movable jaw and said abutment, a ball or roller bearing in the end of said crank arranged to bear against said cam and said 105 abutment whereby said cam is moved to cause said jaws to grip a rope between them, and means including said crank for moving said cam to cause said jaws to release a rope, and a link pivotally secured to the ends of 110 said crank-arm and of said operating rod and lever in such a manner as to permit said crank-arm to move into angular positions relative to said operative rod, substantially as described. 115

14. In a friction-grip for wire-rope tramways, the combination with the cross-bar, the yoke, the operating-lever, the angled fixed jaw, the movable jaw, the cam thereon and the abutment on said fixed jaw, of the crank- 120 arm operatively positioned between said cam and said abutment and arranged and adapted to actuate said cam to cause said jaws to grip and release a rope, the universal joint connecting said crank-arm to said operating-lever, the 125 aperture in said crank and the ball arranged in said aperture arranged to bear on said abutment and on said cam, substantially as described.

15. In a friction-grip for wire-rope tramways, the combination with a bucket or carrier, and a traction-rope, of a supporting 130

member pivotally secured to said bucket or carrier an operating lever and rod pivotally secured to said supporting member and an angled rope-clip member pivotally secured to  
5 said supporting member to swing at right angles to the pivotal movement of said supporting members, of a pair of jaws operatively mounted on the free end of said clip member, and means including said operating-lever for

operating said jaws to grip or release said traction-rope, between them, substantially as described.

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

BYRON C. RIBLET.

Witnesses:

W. J. THAYER,

OTTO S. WIRLE.