

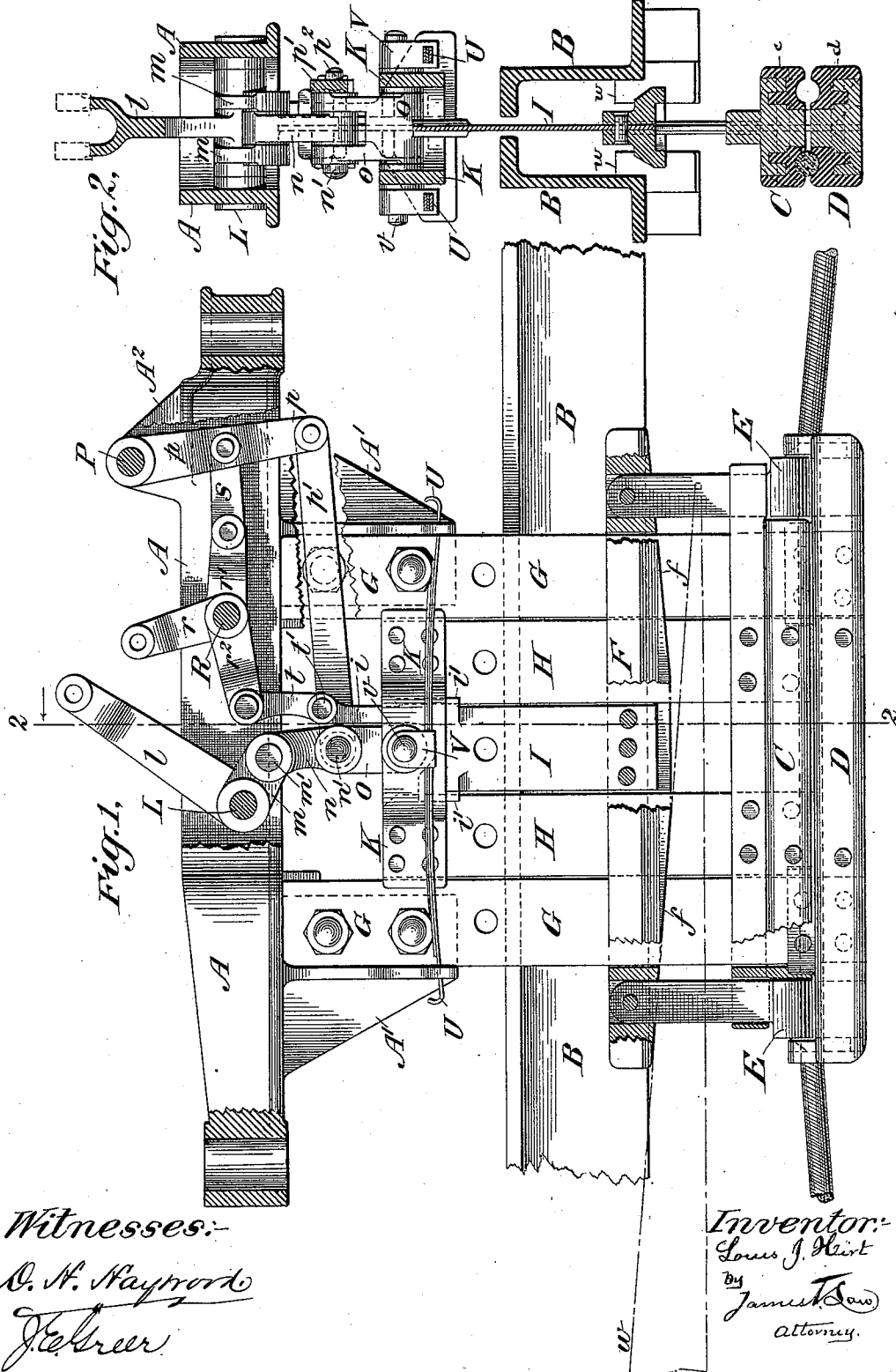
(No Model.)

5 Sheets—Sheet 1.

L. J. HIRT.
CABLE RAILWAY GRIP.

No. 570,173.

Patented Oct. 27, 1896.



Witnesses:

O. H. Raymond
J. E. Green

Inventor:
Lorus J. Hirt
By James T. Saw
attorney.

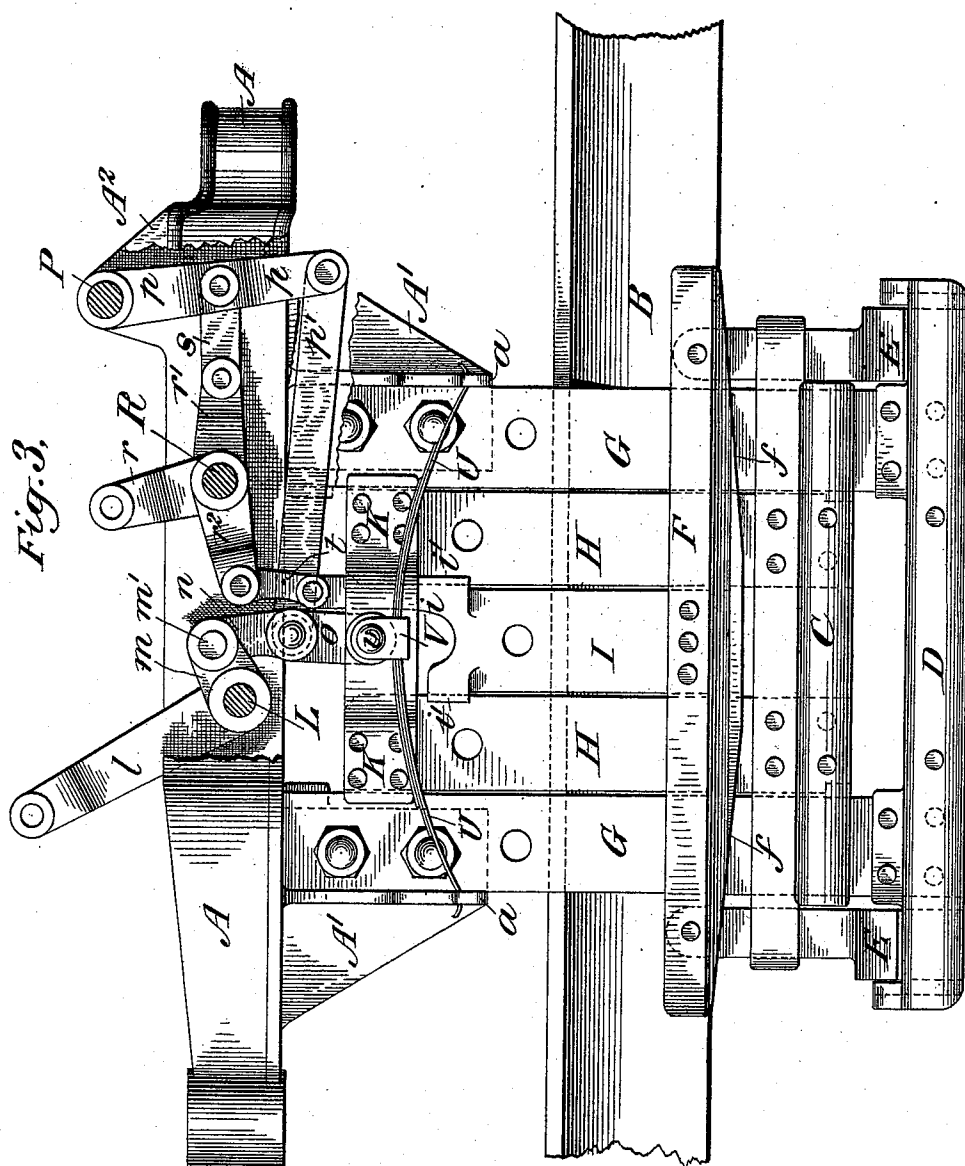
(No Model.)

5 Sheets—Sheet 2.

L. J. HIRT.
CABLE RAILWAY GRIP.

No. 570,173.

Patented Oct. 27, 1896.



Witnesses:

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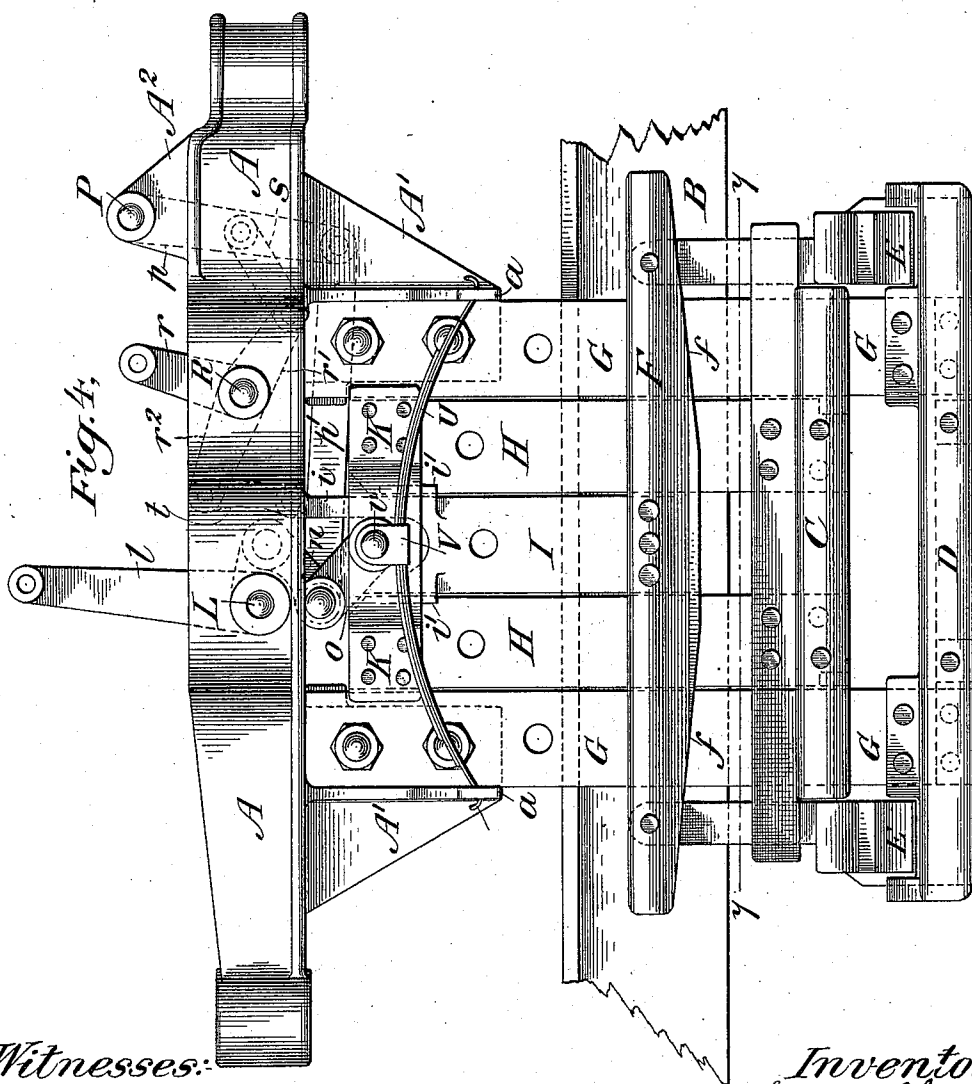
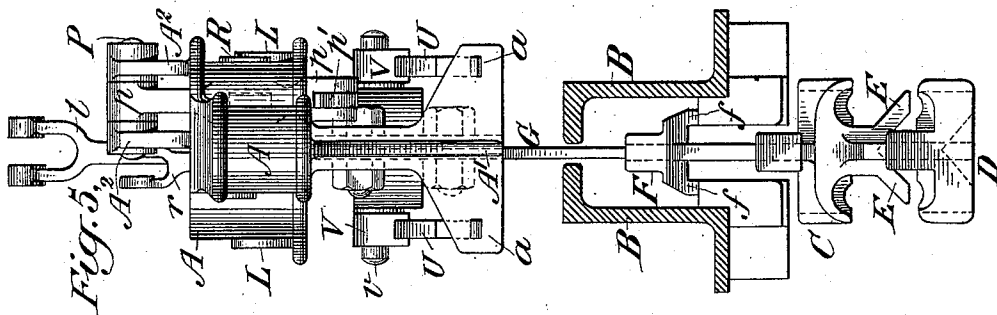
(No Model.)

5 Sheets—Sheet 3.

L. J. HIRT.
CABLE RAILWAY GRIP.

No. 570,173.

Patented Oct. 27, 1896.



Witnesses:

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(No Model.)

5 Sheets—Sheet 4.

L. J. HIRT.
CABLE RAILWAY GRIP.

No. 570,173.

Patented Oct. 27, 1896.

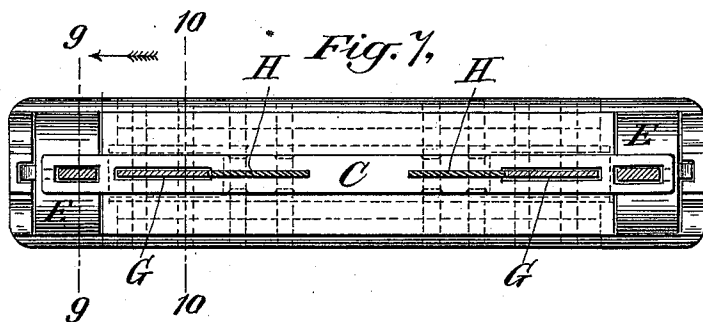
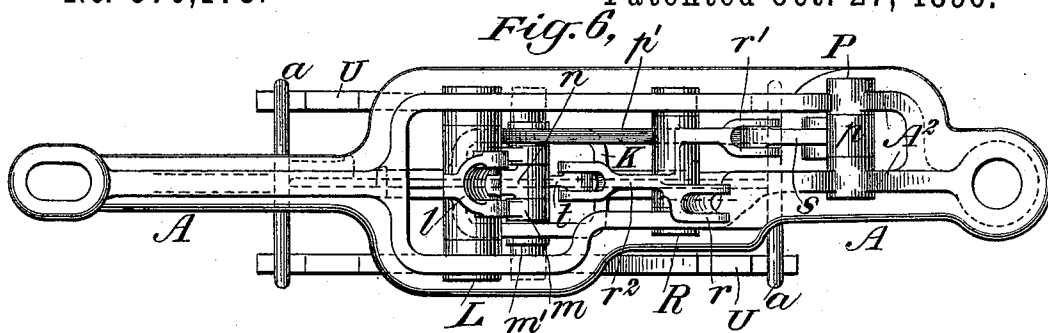


Fig. 9,

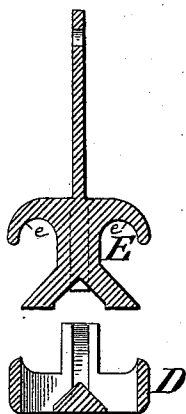


Fig. 11, Fig. 12,

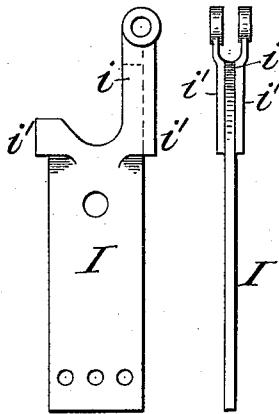


Fig. 10,

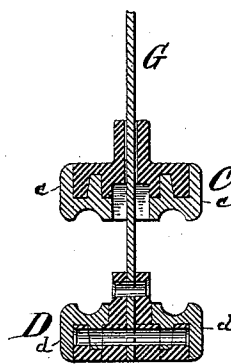
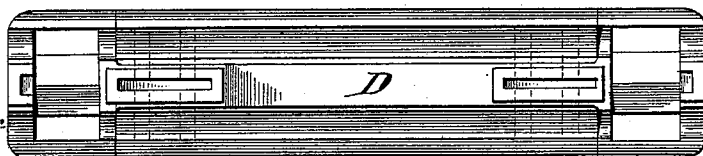


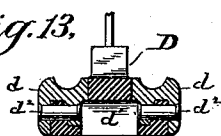
Fig. 8,



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Fig. 13,



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(No Model.)

5 Sheets—Sheet 5.

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Fig. 17.

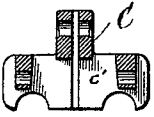


Fig. 19.



Fig. 14.



Fig. 15.



Fig. 18.

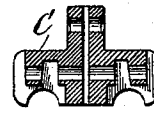


Fig. 16.

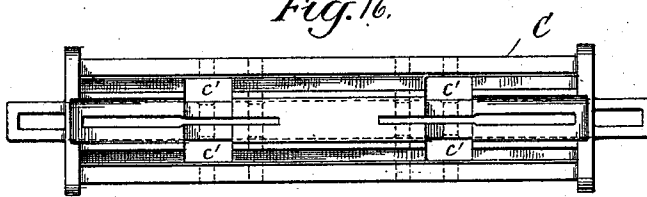


Fig. 20.

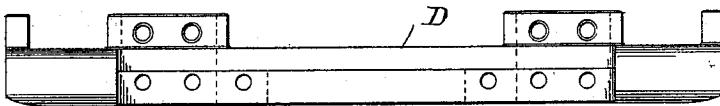


Fig. 21.

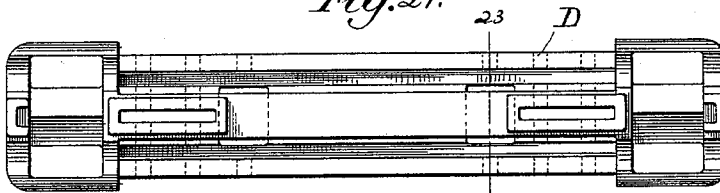
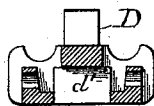


Fig. 22.



Fig. 23.



Inventor:

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UNITED STATES PATENT OFFICE.

LOUIS J. HIRT, OF BROOKLINE, MASSACHUSETTS.

CABLE-RAILWAY GRIP.

SPECIFICATION forming part of Letters Patent No. 570,173, dated October 27, 1896.

Application filed November 12, 1894. Serial No. 528,462. (No model.)

To all whom it may concern:

Be it known that I, LOUIS J. HIRT, a citizen of the United States, and a resident of Brookline, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Cable-Railway Grips, of which the following is a specification.

My invention relates to improvements in mechanism for operating and controlling grips for cable-railways, whereby I am enabled to readily grip and ungrip the cable, and also throw out the cable from the grip from either end of the car, and also to cause the cable to be automatically released and thrown out from the grip at any point of the road desired without reference to the gripman; and my improvements consist in certain combinations of levers and mechanism connected with the grip by which the grip may be opened and closed while the cable-ejector is held locked in a fixed position; and also consists in certain combinations of mechanism for operating the cable-ejector whereby as the ejector is moved to throw out the cable, either from the car or automatically, it operates the grip mechanism and opens the grip; and it further consists in certain novel features of construction of the several parts as hereinafter described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of the grip and mechanism operating the same in the position occupied when the cable is gripped. Fig. 2 is a vertical cross-section through the line 2 2, Fig. 1. Fig. 3 is a side elevation of the grip and mechanism with the grip open to free the cable. Fig. 4 is a side elevation of the same with the grip open and the ejector raised to throw out the cable. Fig. 5 is an end elevation of Fig. 4. Fig. 6 is a plan view of the grip mechanism. Fig. 7 is a sectional plan at the line 7 7, Fig. 4. Fig. 8 is a bottom view of the grip. Fig. 9 is a vertical cross-section through the line 9 9, Fig. 7. Fig. 10 is a vertical cross-section through the line 10 10 of Fig. 7. Figs. 11 and 12 are a side and end elevation, respectively, of the ejector-plate; and Fig. 13 is a vertical cross-section of the bottom grip. Fig. 14 is a side elevation of the upper jaw

of the grip with the cheek-piece removed. Fig. 15 is a detached view of the cheek-piece. Fig. 16 is a plan of the under side of the upper jaw of the grip in Fig. 14. Fig. 17 is a cross-section of Fig. 14 through the line 17 17. Fig. 18 is a cross-section of the same through the line 18 18. Fig. 19 is a cross-section of the cheek-piece through the line 19 19. Fig. 20 is a side elevation of the lower jaw of the grip with the cheek-piece removed. Fig. 21 is a plan view of the upper side of the lower jaw. Fig. 22 is a detached view of the cheek-piece; and Fig. 23 is a cross-section of the lower jaw through the line 23 23, showing the jaw without the cheek-piece.

A is the frame, supported from the car-truck, carrying the grip and its operating mechanism.

B B are the slot-rails on the road between which the grip is suspended.

C and D are the upper and lower jaws, respectively, of the grip.

E is the ejector, and F the ejector-bar by which the latter is operated.

On the frame A are hangers A' A', from which are suspended the vertical plates G G, to the bottom of which is bolted or otherwise fastened the fixed lower jaw D of the grip. Between these stationary plates G G are movable plates or shanks H H, to the lower ends of which is secured the upper and movable jaw C of the grip, and in the center, between the plates H H, is the movable plate I, to which is fastened the ejector-bar F. The plates H H and consequently the movable jaw of the grip are suspended from the horizontal cross-plates K, reaching between the stationary plates G G. The outer ends of these cross-plates extend over the edges of the plates G G and serve to guide and steady the cross-plates as they move up and down in gripping and ungripping the cable, and the plates bulge outward at the center in order to clear the central plate I.

The cross-plates K and consequently the plates H H and the movable jaw of the grip suspended by them are raised and lowered by the following mechanism: Within the open frame A is the rock-shaft L, and to the center of this rock-shaft is connected the lever l, the upper end of which is forked and which is

connected by any suitable means with the operating mechanism at the end of the car. On the rock-shaft are rocker-arms m , placed in such a position that when the lever l is drawn back the arms m are raised. The rocker-arms m are joined by the pin m' to the link n , and the link n is connected to the link o by the joint n' in such a manner that the joint between the links n and o forms a toggle-joint. The lower end of this link o lies between the cross-plates K and is attached to the latter by the pin v . The rocker-arms m are thus connected with the cross-plates K , supporting the movable jaw of the grip, and, as will be understood from Fig. 3, when the lever l is drawn back and thus the rocker-arms raised the cross-plates, and with them the vertical plates H and jaw C , are slid upward and the grip opened. To close the grip, the lever l is thrown in the position shown in Fig. 1, when the arms m are turned downward and the jaw c of the grip pushed down on the cable.

I will now describe the mechanism which operates the ejectors and throws out the cable. These ejectors EE (shown more particularly in Figs. 5 and 9) are suspended at each end of the grip from the ejector-bar F , bolted or otherwise connected to the movable plate I . On standards $A^2 A^2$, at one end of the frame A , is mounted the rock-shaft P , to which is connected the arm p , extending downward within the frame. The lower end of this arm p is pivoted to the link p' , the other end of which is pivoted by the pin p^2 , Fig. 2, to the toggle-joint n' , between the links n and o . Any movement of the arm p therefore operates this toggle-joint and moves the links n and o . Within the frame A and between the arm p and the rock-shaft L is the rock-shaft R , to which is connected the lever r , by which the rock-shaft is operated through any suitable mechanism from the car. On this rock-shaft R are arms r' and r^2 , extending in opposite directions. The end of the arm r' is pivoted to the link s , the other end of which link is pivoted to the arm p . The arm r^2 on the rock-shaft R is pivoted to the link t , which extends downward and is pivoted by the pin t' to the prolongation i of the plate I . The shape of this plate is shown in Fig. 11, and as there seen the prolongation i is at one side of the plate and in such position as to clear the link o and its connecting-pivots and thus permit the plate to slide freely up and down. The edges $i' i'$ of the plate I project over the adjacent sides of the plates H and serve to guide and steady the plate I in its movement up and down.

As will be understood from Fig. 4, when the lever r is thrown back in the position shown in that figure the arm r^2 is raised, and the latter, by means of the link t , slides the plate I up and raises the ejector-bar F and the ejectors E . At the same time the arm r' on the rock-shaft is turned down and by means of

the link s swings the arm p inward. As the latter arm moves it pushes the link p' , to which it is pivoted, in the same direction, and this link being attached to the toggle-joint between the links n and o these links are turned at an angle with each other, and thus their outer joints m' and n' are brought closer together, as shown in Fig. 4, and hence, as will be understood from that figure, the cross-plates K , to which the link o is connected, are drawn up, and with them the plates H and the movable jaw C of the grip, and this without disconnecting any part of the grip-operating mechanism which opens and closes the grip at other times, and at the same time permits the leverage afforded by the link o to be utilized the same as when the same is operated from the lever l . The grip is thus opened by the direct action of the ejector mechanism, and the arrangement of the arms r' and p and the links s and p' is such that the links n and o are acted upon and the grip-jaw raised just immediately before the plate I and ejector-bar F and ejectors E are moved up, and hence it follows that the cable is always ungripped and released when the ejector moves to throw it out of the grip.

With the mechanism above described it is not necessary for the operator to first release the cable by the lever l and the regular grip mechanism; but by merely operating the ejector mechanism through the lever r the cable is both directly released and ejected; and, moreover, when the jaw C of the grip is operated by the regular grip mechanism, as the toggle-joint is not acted upon, the end of the link p' is merely raised and lowered and the link is not pushed in either direction so as to operate the ejector mechanism, but the latter mechanism remains in a fixed and locked position, as will be understood from Figs. 1 and 3. When, however, the cable has been released and ejected by the ejector mechanism, and the parts are in the position shown in Fig. 4, the ejector may be moved back into the recesses in the grip and the grip thus put into position to grip the cable directly through the action of the lever l and the grip mechanism without first reversing the ejector mechanism by means of the lever r . To accomplish this, the lever l is thrown back in the position occupied in Fig. 3. This action of the lever straightens the toggle-joint and brings the links n and o in line with each other, as shown in the figure, and thus pushes the link p' outward. This link swings the arm p , and the latter, by means of the link s , raises the arm r' and turns down the arm r^2 , pushing the plate I down, and with it the ejector-bar F and ejectors E , and bringing all the ejector mechanism in the position shown in Figs. 1 and 3. The grip is thus closed by the lever l and by the grip mechanism, as before described.

To cause the grip to open with greater facility and quickness, I mount a spring U in

the grip-frame so that it bears against the cross-plates K K and forces them upward. The ends of this spring pass through the ribs *a* on the hangers A' of the frame and the center of the spring passes through the swinging bearings V, pivoted to the plate K by the pin *v*. As will be understood from Figs. 1 and 3, when the grip is closed the center of this spring is pressed down and when the grip is released the force of the spring assists it, raising the cross-head K K.

The ejector mechanism is operated automatically by the ejector-bar F. As shown in the drawings, the bottom of this bar is formed with the inclined surfaces *ff*, and within the trench at the point where it is desired to eject the cable is placed an inclined surface *w*, corresponding with the incline *f* and of such a height that its highest part is above the bottom of the bar F when the ejectors are down in their recesses below the cable.

As the grip, and of course with it the bar F, moves along in the trench the incline *f* on the bar strikes the inclined surface *w* and slides along on the latter, and as it does so the bar F is raised and raises the ejectors E, suspended from it. At the same time the bar F lifts the plate I, to which it is bolted or otherwise attached, and the latter sliding up, by means or the prolongation *i* and link *l*, operates the arms *r*² and *r*' and the ejector mechanism and, through the toggle-joint *n*', raises the plates H H and opens the grip, as before described, and hence whenever the operator or gripman neglects to open the grip and throw out the cable at the points along the road where it is required the compact of the bar F with the incline *w*, situated at such points, opens the grip and ejects the cable without regard to the gripman.

The sides and inner cable-engaging surfaces of the grip-jaws are formed by detachable cheek-pieces *c* and *d*, which are bolted onto the sides of the jaws. The cheek-pieces on each side of the jaws are separate and distinct from each other, and are separately connected to the jaws, so that the piece on one side of the grip may be removed without disturbing that on the other side. To enable the cheek-pieces *c* and *d* to be bolted separately to the jaws, they are formed as shown in Fig. 19, which is a view of the piece *c* for the upper jaw, and the jaws are constructed with recesses *c'* and *d'*. By reason of these recesses, as will be understood from Figs. 17 and 19, it is possible to bolt each cheek-piece on separately, the bolt passing through one side of the jaw only and terminating in the recess, as shown in Fig. 13 in the case of the lower jaw. By reason of this construction, if through any accident the jaw of the cable is caught only one side is torn off and not the whole shoe. Furthermore, it is possible to repair the grip more readily. In constructing these cheek-pieces it is intended to form the sides of very hard metal or composition

to stand the wear and form the inner cable-surface of a softer metal.

The ejectors E are provided with retaining-forks *ee*, intended to lock the cable in the grip as the ejector is lowered down in its recess.

I claim as my invention—

1. In a grip for cable-railways, in combination, a stationary grip-jaw, a movable grip-jaw, a cable-ejector, grip-jaw-actuating mechanism, cable-ejector-actuating mechanism, and means permanently connecting the two actuating mechanisms so as to render the jaw-actuating mechanism positively actuated from the ejector-actuating mechanism for the purpose of releasing the cable, the ejector-actuating mechanism operating the ejector to throw out the cable after it has set into operation the jaw-actuating mechanism, the connection between the two actuating mechanisms permitting the jaw-actuating mechanism to operate the grip and release the cable without operating the ejector-actuating mechanism when the latter is in its normal position, substantially as and for the purposes described.

2. In a grip for cable-railways, in combination, a stationary grip-jaw, a movable grip-jaw, a cable-ejector, grip-jaw-actuating mechanism, cable-ejector-actuating mechanism, a lever for operating the same, and means permanently connecting the two actuating mechanisms so as to render the jaw-actuating mechanism positively actuated from the ejector-actuating mechanism for the purpose of releasing the cable, the ejector-actuating mechanism operating the ejector to throw out the cable after it has set into operation the jaw-actuating mechanism, and the connection between the two actuating mechanisms permitting the jaw-actuating mechanism to throw the ejector into its normal position without first restoring the ejector-actuating mechanism to its normal position through the instrumentality of its operating-lever, substantially as and for the purposes described.

3. In a cable-grip mechanism, in combination, a movable grip-jaw, mechanism for operating the same, a toggle-joint interposed between the grip-jaw and its operating mechanism, an ejector for throwing out the cable, mechanism for raising and lowering the ejector connected with the toggle-joint whereby the ejector mechanism operates the toggle-joint and opens the grip, substantially as described.

4. In a cable-grip mechanism, the combination with the movable jaw C, plates H, H, cross-plate K and toggle-joint *n*, *n'*, *o*, of the ejector E, the bar F, plate I, rock-shaft R, rocker-arms *r*' and *r*² and link *l* for operating the ejectors, and the rock-shaft P, rocker-arm *p* and link *p'* connected with the toggle-joint, whereby the toggle-joint is operated and the grip opened as the ejector is raised, substantially as described.

5. In a cable-grip for railways, the grip-jaws provided with the recesses c' , d' , and the cheeks c , d , on each side of such recesses, substantially as described.

- 5 6. In a cable-grip mechanism, the ejectors E provided with the retaining-forks e , e , whereby the cable is guided into the grip by the descent of the ejector, substantially as described.

Signed at New York city, in the county of 10
New York and State of New York, this 2d
day of November, A. D. 1894.

LOUIS J. HIRT.

Witnesses:

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