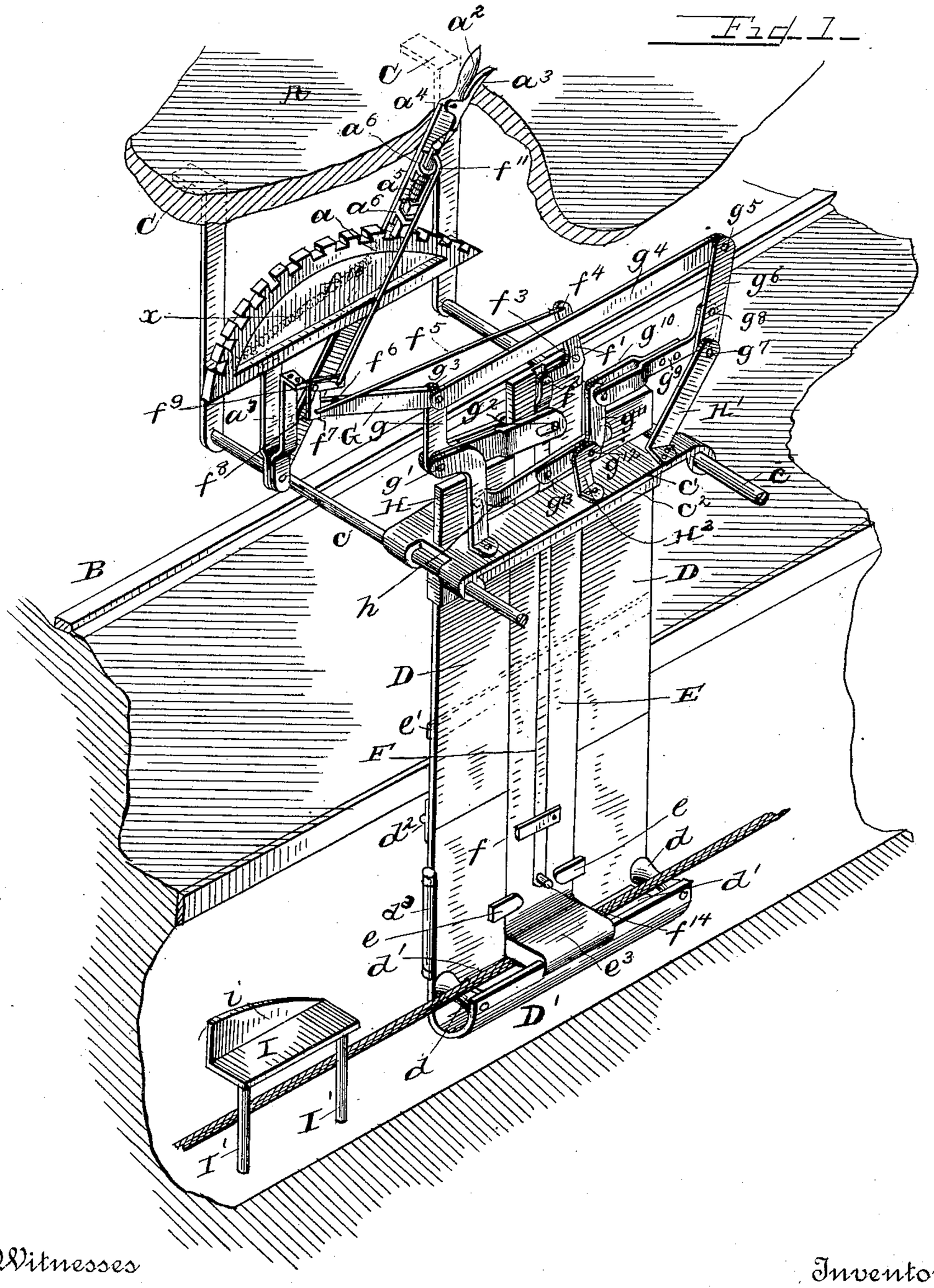
(No Model.) 3 Sheets—Sheet 1.

J. E. MORRIS.

CABLE GRIPPER AND MEANS FOR CARRYING THE SAME OVER CROSSING CABLES.

No. 434,673. Patented Aug. 19, 1890.

Fig. 1.



Witnesses

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By his Attorney

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

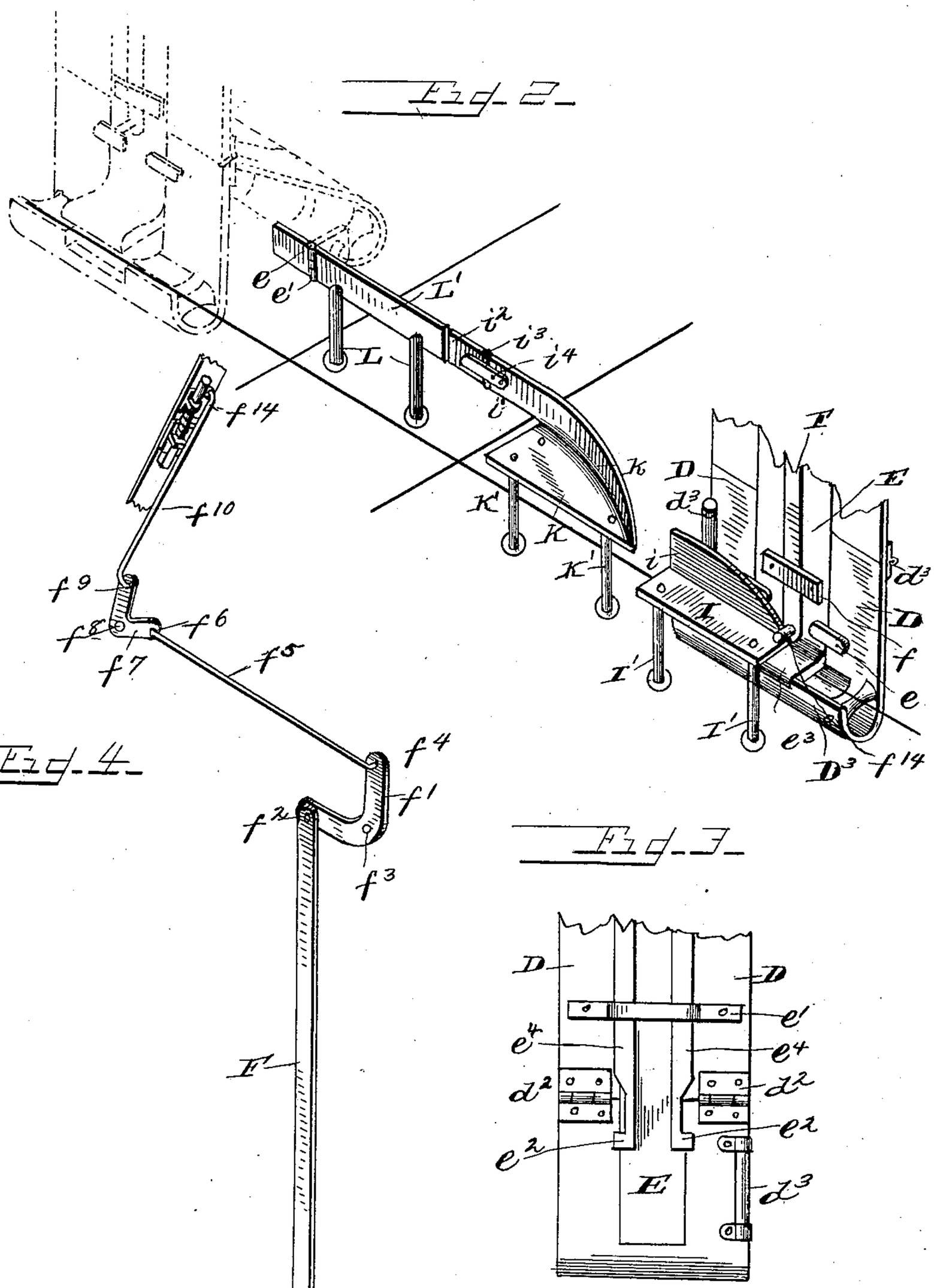

Fig. 4.

Fig. 3.

Witnesses

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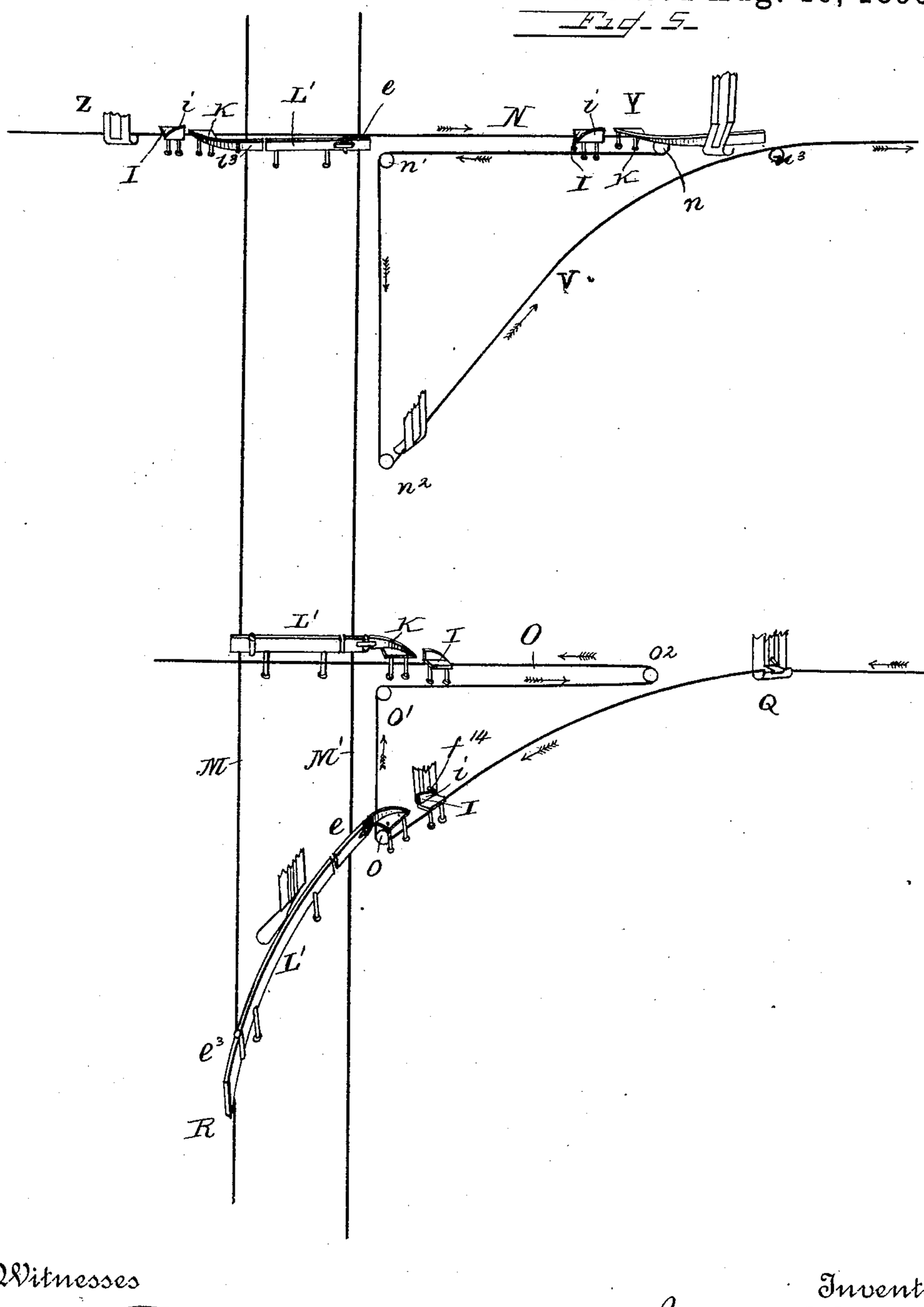
Fig. 5.



Witnesses
G. A. Tauberschmidt,
Chas. J. Stockman.

Inventor
James E. Morris
By his Attorney
Edwin S. Clarkson

UNITED STATES PATENT OFFICE.

JAMES EUGENE MORRIS, OF CHESTER, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WILLIAM H. WILLIAMS, OF SAME PLACE.

CABLE-GRIPPER AND MEANS FOR CARRYING THE SAME OVER CROSSING CABLES.

SPECIFICATION forming part of Letters Patent No. 434,673, dated August 19, 1890.

Application filed April 18, 1890. Serial No. 348,507. (No model.)

To all whom it may concern:

Be it known that I, JAMES EUGENE MORRIS, a citizen of the United States, residing at Chester, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Cable-Grippers and Means for Carrying the Same Over Crossing Cables; 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 letters of reference marked thereon, which form a part of this specification.

My invention relates to traction-cable systems, and is fully set forth in the following specification and claims.

The objects of my invention are, first, to provide a device for releasing a grip and carrying it over crossing cables and securing it where the cables of two lines cross each other; second, a grip which is capable of being automatically or mechanically released from the cable at the crossing, as found most convenient, by means of the said device at the crossing; third, to provide a grip which will automatically adjust itself to the irregularities of the grip-slot rail and to curves or turns in the line, and, fourth, to provide a passage through this device for the grip on the line of cars running on the cross-line.

For purposes of illustration I shall refer to the cables crossing each other as north and south and east and west lines.

My invention consists of a cam-shaped plate suitably mounted on standards a requisite distance above the cable on the north and south line, another cam-plate provided with a spring-actuated gate extending out over one of the lines running east and west. Between the east and west cables is secured another plate suitably mounted, which also has a spring-actuated gate which extends out over the other cable of the east and west line, the said gates opening in different directions—one to the east and one to the west. To the car is attached the grip by means of suitable brackets, the upper part of the grip having a sliding bearing on the cross-bar of said bracket. The said grip is composed of a central sliding or reciprocating frame having a presser-foot or grip at its lower end, having a concave under face, said central frame working in an outer reciprocating frame, said outer frame having a lower hinged portion, the end of which is concaved, in which are secured rollers at each end and a suitable gripping medium. On the front of this outer frame is secured a roller or other suitable device to facilitate the hinged portion of the outer frame in sliding over the cam-plate. The said inner and outer frames both reciprocate, as above stated, and are provided with a series of levers attached to a single lever pivoted to the starting and stopping hand-lever. The center reciprocating frame has a sliding bar moving in a slot or recess in its inner face, provided with a pin or lug on its lower end and pivoted at its upper end to a bell-crank lever, which in turn is connected to a rod connected to a second bell-crank lever pivoted to the hand starting-lever. Another rod is connected to the other end of this bell-crank lever, said rod being connected to the pawl or dog on the hand-lever.

In the accompanying drawings, which form a part of my application, Figure 1 is a perspective view of the complete mechanism of the grip, the bottom of the car and the conduit being broken away, and the table I, the grip being closed. Fig. 2 is a perspective view of the automatic table and the tables forming a bridge over the crossing cables, also the lower portion of the grip. Fig. 3 is a rear view of the lower portion of the grip. Fig. 4 is a diagrammatic view of the series of automatic operating-levers and the spring-pawl in perspective. Fig. 5 is a plan view of a system of laying cables around curves, with the bridge and automatic table in perspective.

In the said drawings, which form a part of my application, A represents a portion of a car mounted on suitable wheels running on track B.

a is a rack-bar secured to front platform.

Through the bottom of the car is a slot (not shown) in which a hand starting and stopping lever a^2 works, said hand-lever a^2 having a

trigger a^3 pivoted to the hand-lever by means of ears a^4, said trigger having a suitable connection with spring-pawl a^5, the pawl moving in guideways a^6 and engaging the teeth on rack-bar a.

a^7 is a bracket secured to the bottom of the car, the lever a^2 being suitably pivoted in this bracket a^7.

Secured to the underside of the car are four standards C, connected at their lower ends by a rod c. On these rods c is secured a plate c', said plate being adapted to slide on rods c in order to adjust itself to the irregularities and curves in the road. The plate c' is provided with a central slot and a downwardly-projecting collar c^2. Through this collar work two reciprocating frames D and E, said frame D having at its base a concaved portion D', in which are journaled rollers d d, and a suitable gripping medium d'. This frame is hinged at d^2 and is provided with a roller d^3. The frame E works in frame D, and is provided with flanges e^4, strap e' keeping the frame E in its place, said strap being secured to frame D in a suitable manner. On the frame E are two lugs e e, which limit the inward movement of the hinged portion of D. On the reverse side of the parts now under consideration, as shown in Fig. 3, a strap e', above referred to, serves to keep frame E in position. Secured to the bottom of the flanges e^4 and forming a continuation of the same, is an L-shaped plate e^2 extending over and bearing upon the two frames D and E below the hinge-joint d^2 of frame D. The frame E is also provided with a gripping-foot e^3, having a concaved under face. On the inner face of E is a slot or recess in which works a sliding bar F, secured near its lower end by suitable means f, attached to E, as shown in Fig 1, said sliding bar F having a pin or finger f^{14}.

I will now describe these parts in connection with the series of levers. Pivoted to the hand-lever a^2 is a link G, which is pivoted to the bell-crank lever g. Said bell-crank lever g is pivoted at g' to standards H and to frame E at g^2. Pivoted to bell-crank lever g at g^3 is another link g^4. Said link g^4 is also pivoted at g^5 to lever g^6, lever g^6 being pivoted at g^7 to standard H'. To lever g^6 at g^8 is pivoted lever g^9, which has a forked end pivoted at g^{10} to a bell-crank lever g^{11}, which is pivoted at g^{12} to standard H^2. Said bell-crank g^{12} is pivoted at g^{13} to a cross-bar h, which is secured at both ends to the frame D, said bar having a slight outward bend. Pivoted to sliding bar F at f^2 is a bell-crank lever f'. Said bell-crank is further pivoted at f^3 to frame E. At f^4 a rod f^5 is pivoted to bell-crank lever f'. The other end of this rod f^5 is pivoted at f^6 to a bell-crank lever f^7, pivoted at f^8 to the hand-lever a^2 in common with link G. Pivoted to the other end of bell-crank lever f^7 at f^9 is a rod f^{10}, the end of said rod being bent at right angles at f^{11} and secured in the eye formed in top of the spring-pawl a^5. x is a pulling-string secured to the hand-lever and the car.

In Fig. 2 I have shown a crossing of cables with parts of the grip. In said figure, I is a table mounted upon legs I' I', said table having an upwardly-extending cam portion i. K is another table mounted on standards K', and provided with an upwardly-extending cam portion k, said cam portion extending out beyond the table proper, as at i', and provided with a gate i^2, hinged at i^3, said gate being held in a closed position over the crossing cables by a spring i^4. Between the crossing cables (for purposes of illustration we will say the east and west cables) are mounted on standards L a table L', provided with a gate e, hinged at e', which is held in a closed position by a spring similar to i^4. This gate l also extends over one of the cables running east and west. The parts shown in this figure are all located in the conduit.

In Fig. 5 I have shown a system of laying cables around curves in an economical and practical manner, in which M and M' are cables running east and west. N and O are cables running north and south on different streets, one cable only being shown on the north and south streets; but it will be understood that I can use two with equal facility. The cable N is bent around pulley n. The cable is then drawn back through the same conduit and passed around pulley n', which is secured at the corner of the east and west and north and south conduits. The cable is then drawn through the east and west conduit and passed around pulley n^2. It is then drawn through the curve-conduit to the north and south conduit at n^3, this arrangement serving to switch the east and west cars to the north and south line. In the lower part of this figure I have shown a system to switch the north and south cars to the east and west line. In this instance the north and south cables are first drawn around the curve, then around pulley o through the east and west conduit to pulley o', thence through the north and south conduit to pulley o^2, thence around said pulley, resuming its regular course, as indicated by the arrow.

At the several crossings and curves I have shown my improved bridge or crossing, and in several places the position of the grip in crossing the above.

The operation of my traction-cable system is as follows, reference being had particularly to Fig. 2: The grip is shown going under table I and the pin or finger f^{14} ready to ride up the cam portion i, the car continuing in the movement. The pin f^{14} rides up the cam portion, forcing the sliding rod F up. This moves the bell-crank lever f' on its pivot f^3, which in turn pulls the rod f^5 back, working the bell-crank lever f^7, and pushes the rod f^{10} up and pulls the spring-pawl a^5 out of engagement with the teeth on the ratchet-bar a by means of the right-angle portion f^{11} of rod f^{10},

being secured to an eye in the top of the spring-pawl. (See Fig. 4.) The hand operating-lever being free from the ratchet-bar, the spring x pulls it to its normal position. The hand-lever a^2, in being pulled to its normal position, operates the links G and bell-crank lever g, which pulls the frame E, to which is connected the gripping-foot e^3, up, the flanges e^2 e^2 being in this position above the hinge d^2, and the links g^4, lever g^6, lever g^9, and bell-crank lever g^{11}, which acts on cross-bar h, secured to frame D, are also operated by this movement, thus pushing the said frame down and releasing the cable. The cable is now ready to be carried over the crossing cables, the car still moving. The roller d^3 on forward part of the hinged portion of the frame D strikes the cam k on table K and rides up said cam, raising the hinged portion to a substantially horizontal plane. Said hinged portion continues to ride in this position over portion i', gate i^2, table L', and gate e, secured to L. Said gate e carries the hinged portion over and past the last crossing cable, as shown in dotted lines, and as soon as the hinged portion has passed the gate e it drops nearly into position under the cable by its own gravity. The foot e^3 rides directly above the cables. The above-enumerated movements are all automatic, thus obviating the liability of breaking the grip and abrading or breaking the strands of the cables at crossings caused by careless gripmen. The hinged portion having passed off of gate e and dropped nearly into position under the cable, the parts are again closed by the gripman, the flanges e^2 e^2, sliding on the hinged portion, forces said portion directly under the cable in position, and the car continues on its course. It is obvious that a grip crossing this line simply strikes against one or the other of gates i^2 or e, according to the direction in which they are traveling, pushes it open and passes on without interruption. The gate is then closed by means of the spring i^4. In Fig. 5 a car Z is running on cable N, (see upper portion of figure,) the grip is released automatically from the cable and the hinged portion runs on the several tables over the crossing cable and falls into position, and the cable is again taken up, as above described. The grip is now approaching the pulley n, and to prevent it from being broken by the same another series of tables are placed, as at Y, and the grip is opened automatically and carried on the tables, dropped, and takes up the cable, as before stated. It is now desired to switch a car from the east and west line to the north and south line. The gripman opens the grip before the car reaches the curve V, and the momentum of the car carries it past pulley n^2. Then the grip is closed again and continues around the curve and onto the north and south line without further interruption. It is now desired to switch a car from a north and south line to the east and west line, reference being had to the bottom portion of Fig. 5. The car at Q is switched and passes around the curve, still holding the cable until the grip strikes the table and is opened, the hinged portion riding free of the pulley o over the series of tables and gates, the tables and gates in this instance being curved to conform to the slot-rail, the hinged portion falls and the grip is again closed, taking up one of the east and west cables. This system of laying cables around curves obviates the necessity of having a number of horses stationed at each curve to pull the cars around corners or in switching from one line to another, and dispenses with the supplemental cable now employed upon curves. In Fig. 5 I have simply shown the cables for the sake of clearness.

I do not herein claim the system of laying the cables around curves, as it forms the subject-matter of another application filed by me June 21, 1890, Serial No. 356,209.

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

1. In an automatic releasing-grip for cable cars, the combination, with the outer reciprocating frame having the lower portion of its body hinged and provided with a cable-carrying portion, and a roller mounted on the front edge of the hinged portion, of a central reciprocating frame having flanges which bear on the outer frame, and a device located near the bottom of the central frame connected with and operating the spring-pawl, substantially as described.

2. In an automatic releasing-grip, the combination, with the outer reciprocating frame having the lower portion of its body hinged, and the central reciprocating frame, of a sliding bar secured to said central frame and connected to and operating the spring-pawl, substantially as described.

3. In an automatic releasing-grip for cable cars, the combination, with the outer reciprocating frame having the lower portion of its body hinged and provided with a cable-carrying portion, and a roller mounted on the front edge of said hinged portion, and a central reciprocating frame having L-shaped flanges which operate on the hinged part of the outer frame, of a sliding bar secured to the central frame and connected with and operating the spring-pawl, substantially as described.

4. The combination, with the rack-bar, of a hand operating-lever, a spring-pawl secured thereto and operated by a trigger pivoted near the top of the hand-lever, said pawl engaging the teeth of the rack-bar, a bracket secured under the car, in which the hand-lever is pivoted, a lever pivoted to said hand-lever, a bell-crank lever operating on the central frame, a cross-bar connecting the top of the outer frame, a bell-crank lever one end of which is pivoted thereto, and a series of levers connected to the other end of said bell-crank lever and

pivoted to the first-mentioned bell-crank lever in common with the lever pivoted to the hand operating-lever.

5. The combination, with the rack-bar and spring-pawl, of a sliding bar provided with a finger near its lower end, a bell-crank lever pivotally attached to the upper end of the sliding bar, a bell-crank lever pivoted to the hand operating-lever and connected to the first-mentioned bell-crank lever by a rod, a rod secured to the spring-pawl and to the bell-crank lever pivoted to said hand operating-lever, and a pulling-spring secured to the hand-lever and rack-bar, substantially as described.

6. In a grip, the combination of the rack-bar, a hand operating-lever provided with a trigger and spring-pawl and pivoted in a bracket below the car, the brackets C, rods c, connecting the same, a sliding slotted plate working on said rods c, a depending collar c^2, secured to said sliding plate, a cross-bar h, connected to frame D, a series of levers mounted upon standards H, H′, and H² on the sliding plate and connected by link G to hand operating-lever a^2, the reciprocating frames D and E, operated by said series of levers, the lower part of frame D hinged at d^2, a concaved foot D′ on said hinged part, rollers d and d' mounted therein, a roller d^3 on the front end of the hinged portion of frame D, lugs e e on frame E, flanges e^4 on rear of frame E, an L-shaped plate e^2, a gripping-foot e^3 on frame E, with a sliding bar F, a finger f^{14} near the bottom of the same, a bell-crank lever f', pivoted at f^2 to said bar F, a rod f^5, a bell-crank lever f^7, pivoted to hand-lever a^2 and connected to bell-crank lever f' by rod f^5, and a rod f^{10}, pivoted to the lever f^7 and connected to the spring-pawl a^5 in a suitable manner, substantially as described.

7. In a traction-cable system, the combination of the frames D and E, the frame D having a portion of its body hinged, a sliding bar F, connected to spring-pawl a^5, as described, and provided with a finger f^{14}, an automatic releasing device operating on finger f^{14}, and means for carrying the hinged portion of frame over crossing cables.

8. In a traction-cable system, the combination of the reciprocating frames D and E, the frame D having a portion of its body hinged, roller d^3 on said hinged part, sliding bar F, suitably connected to and operating the spring-pawl a^5, a finger f^{14} on the lower part of sliding bar F, an automatic releasing device I, operating-lever F, and releasing-pawl a^5, and tables K and I′, which push the hinged portion of the grip backward and upward, said hinged portion riding over the crossing cables in a substantially horizontal plane, substantially as described.

9. In a traction-cable system, the combination, with a device secured on a grip having a hinged section and connected to the spring-pawl, of a cam-table I, operating said device, the table K, having a cam k and outwardly-extending portion i, a gate secured thereto, and the table L′, also provided with a gate, said gates extending and working over the crossing cables, all substantially as and for the purposes described.

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

JAMES EUGENE MORRIS.

Witnesses:
JNO. C. SMITH,
STEPHEN S. LAWRENCE.