(No Model.) 4 Sheets—Sheet 1.

R. SOLANO.

GRIPPING MECHANISM FOR CABLE RAILWAY CARS.

No. 344,057. Patented June 22, 1886.

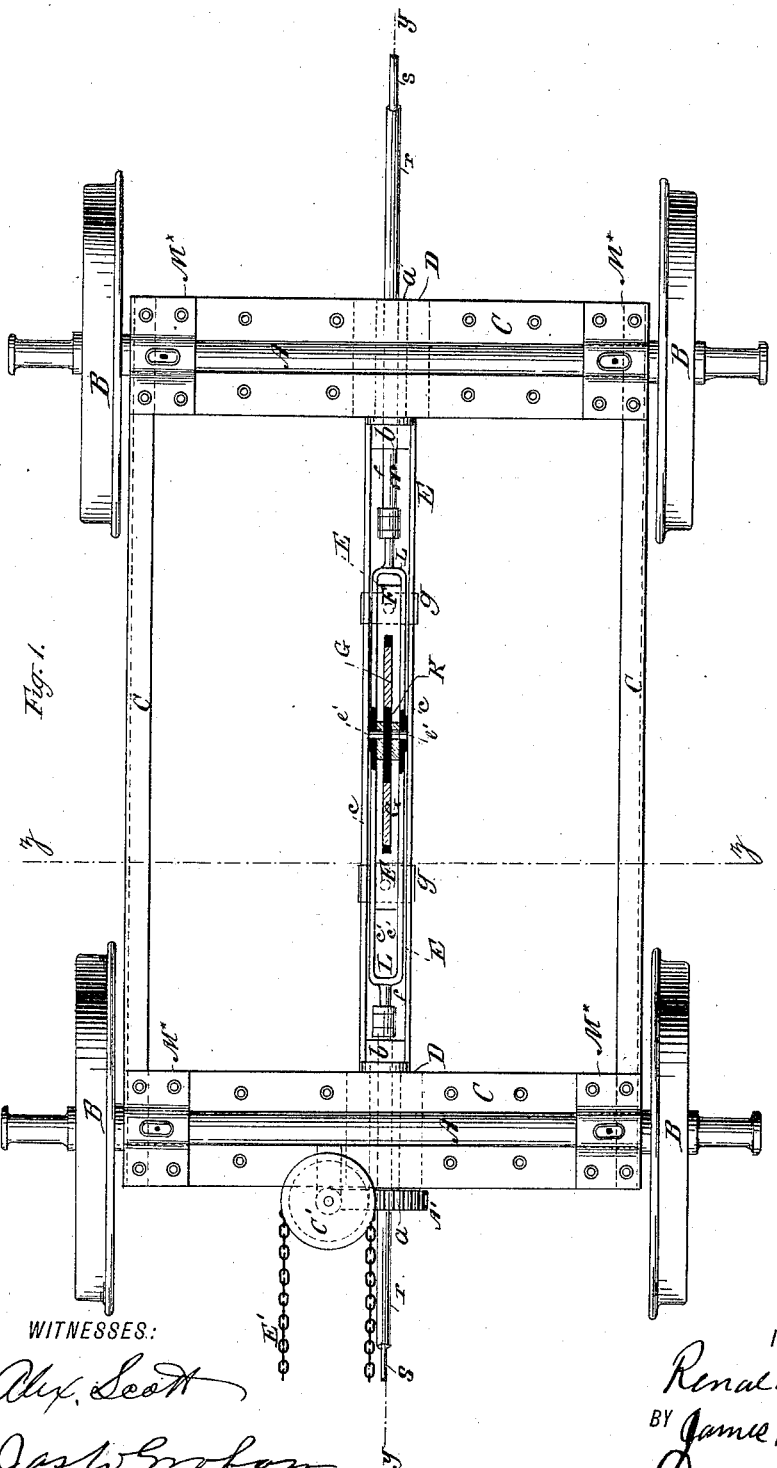

Fig. 1.

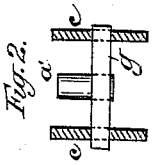

Fig. 2.

WITNESSES:

Alex. Scott

Jas. W. Brown

INVENTOR

Renaldo Solano

BY James A. Whitney

ATTORNEY

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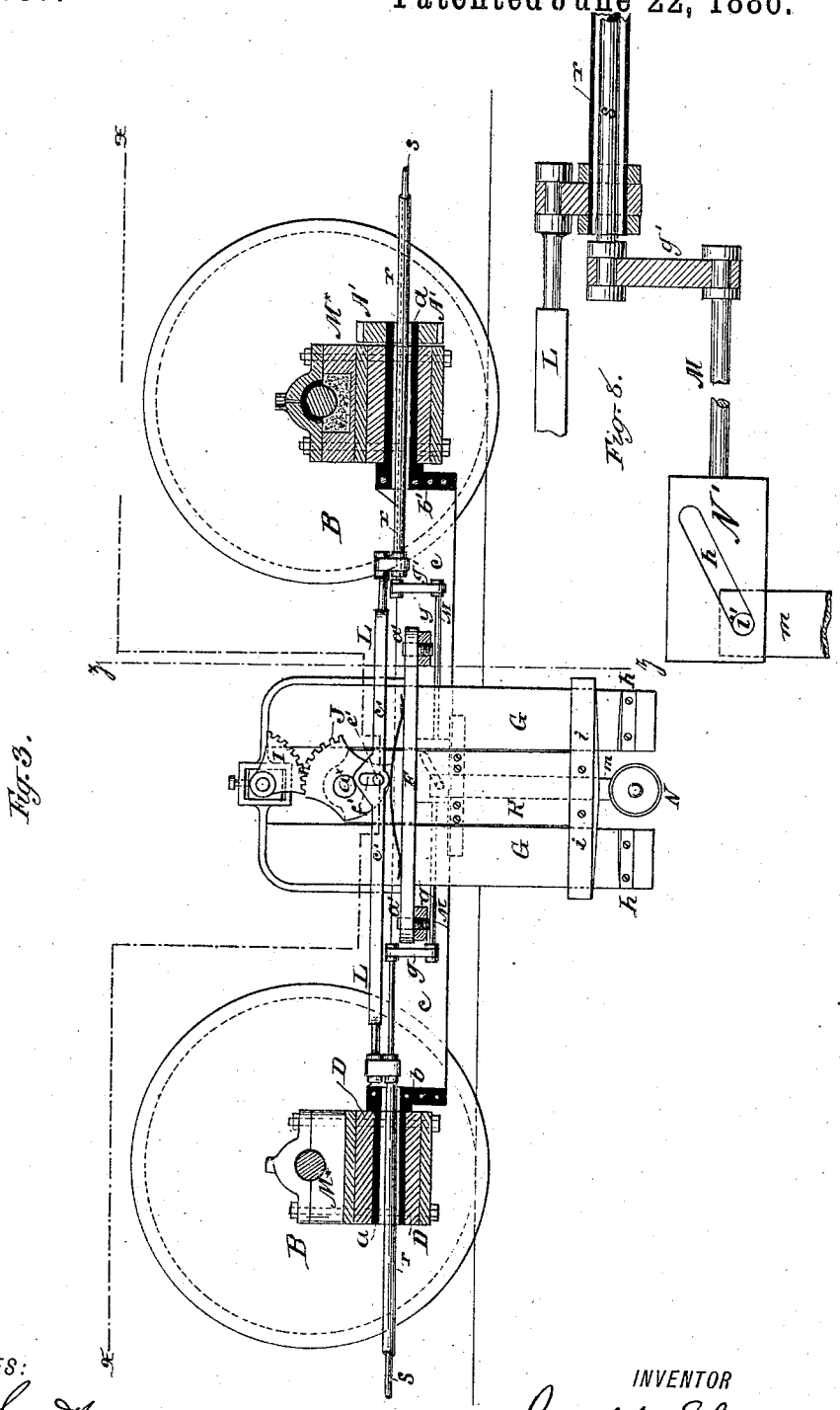

Fig. 3.

Fig. 8.

WITNESSES:

Alex. Scott

Jas. W. Graham

INVENTOR

Renaldo Solano

BY James A. Whitney

ATTORNEY

(No Model.)

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R. SOLANO.

GRIPPING MECHANISM FOR CABLE RAILWAY CARS.

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Fig. 4.

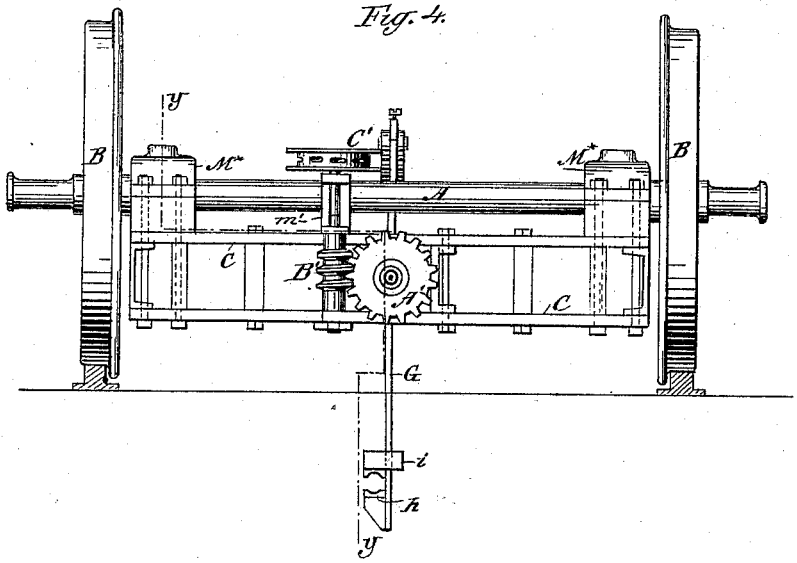
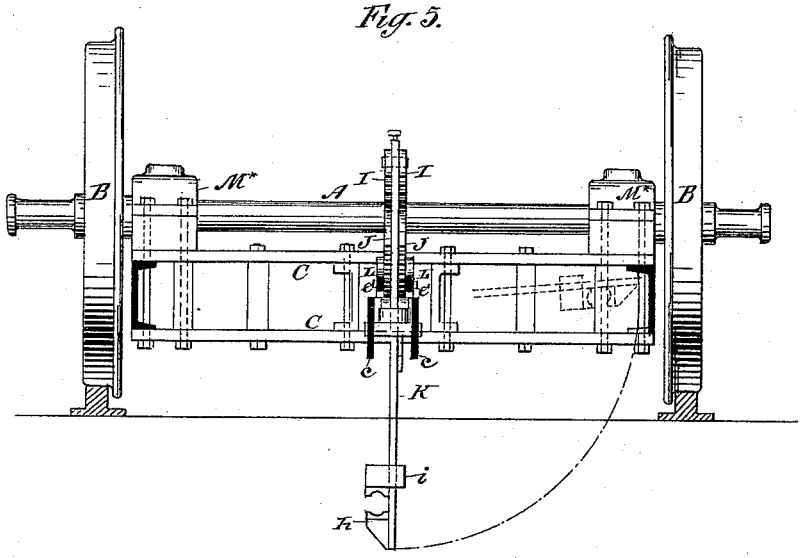


Fig. 5.



WITNESSES:

Alex. Scott

Jas. W. Graham

INVENTOR

Renaldo Solano

BY James A. Whitney

ATTORNEY

(No Model.) 4 Sheets—Sheet 4.

R. SOLANO.

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Fig. 6.

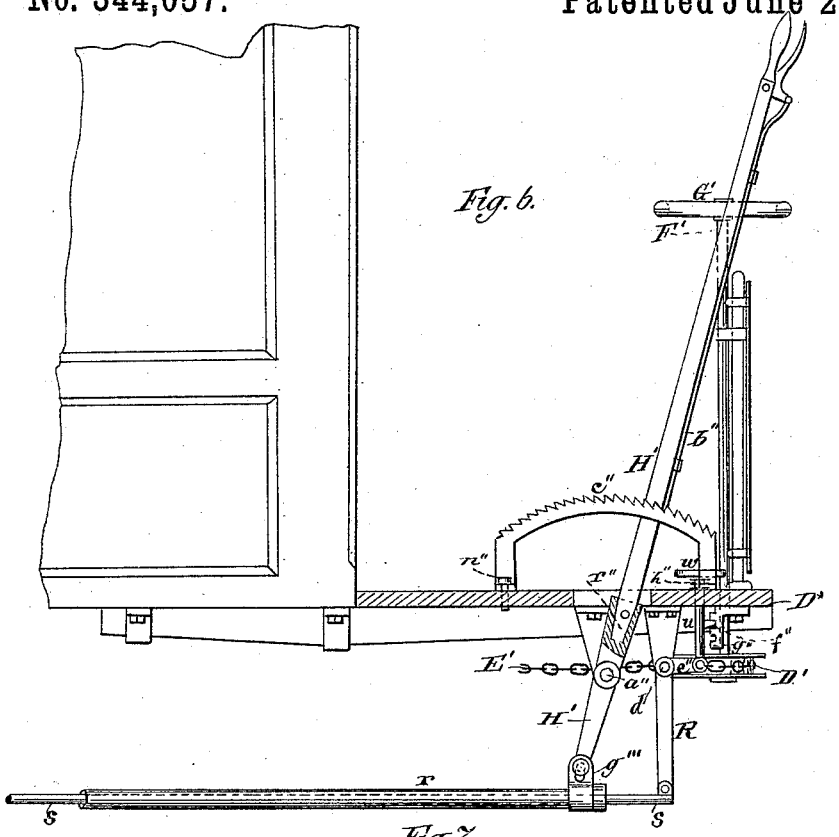
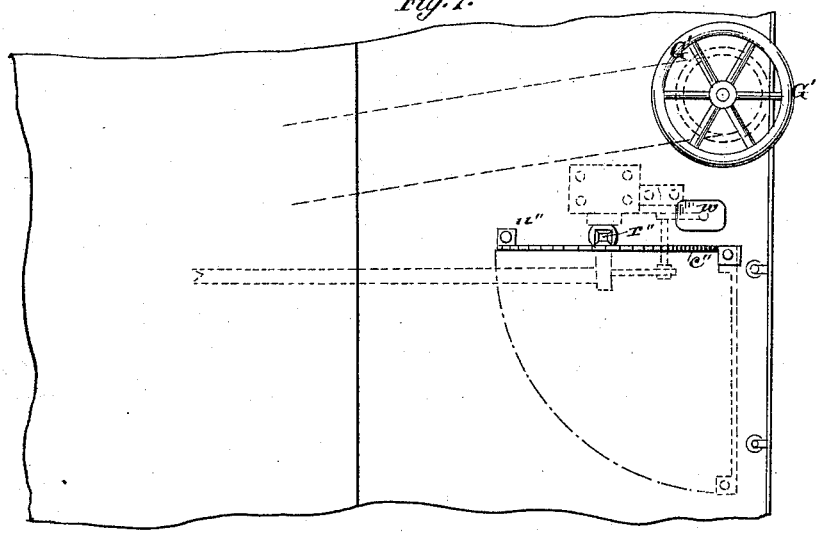


Fig. 7.



WITNESSES:

Alex. Scott

Jos. W. Gorham

INVENTOR

Renaldo Solano

BY James A. Whitney

ATTORNEY

UNITED STATES PATENT OFFICE.

RENALDO SOLANO, OF BROOKLYN, NEW YORK.

GRIPPING MECHANISM FOR CABLE-RAILWAY CARS.

SPECIFICATION forming part of Letters Patent No. 344,057, dated June 22, 1886.

Application filed January 7, 1886. Serial No. 187,919. (No model.)

To all whom it may concern:

Be it known that I, RENALDO SOLANO, late of San Francisco, in the State of California, but now of Brooklyn, in the county of Kings, in the State of New York, have invented certain Improvements in Gripping Mechanisms for Cable-Railway Cars, of which the following is a specification.

The object of this invention is to provide simple, strong, durable, and effective means of swinging devices which grip upon an operating-cable in so-called "cable railways" laterally outward from the cable when the connection requires, there being of course a suitable opening or outlet provided through which the grip devices aforesaid may move outward and inward as they are detached and removed from the cable or swing inward for connection therewith.

My invention comprises certain novel combinations of parts whereby the aforesaid objects are effectually secured, and whereby the efficiency and convenient operations of cable railways are materially increased.

Figure 1 is a plan view and partially horizontal sectional view of an apparatus embodying all of said invention, and taken on the line *x* of Fig. 3. Fig. 2 is a detail view of certain parts shown in Figs. 3 and 5. Fig. 3 is a vertical longitudinal sectional view taken in the line *y* of Figs. 1 and 4. Fig. 4 is an end view. Fig. 5 is a vertical transverse section view taken in the line *z* of Figs. 1 and 3. Fig. 6 is a vertical and longitudinal sectional view, on a larger scale, of certain parts of an apparatus designed to be used in connection with parts more fully represented in Figs. 1 and 2. Fig. 7 is a plan view of the parts represented in Fig. 6. Fig. 8 is a detailed view, on a larger scale, of certain of the parts represented in Fig. 3.

A indicates the axles, and B indicates the car-wheels, of any ordinary or suitable car—such, for example, as is used in ordinary horse-railways. C is the horizontal frame, vertically attached to the said axles by means of boxes M*, as shown in Figs. 1, 3, and 5. At the front and rear of this frame are longitudinal bearings and journal-boxes D, through each of which extends a tubular shaft, *a*, the inner ends of which are attached to the adjacent extremities of the longitudinal frame E in such a manner that by giving a racking and axial movement to the tubular shaft *a* a corresponding swinging movement may be given to the frame E.

When the grip is in normal use or operation—as, for example, during the propulsion of the car—the frame E is vertical, the purpose of which will hereinafter appear.

The frame E may be most conveniently constructed of two end blocks, *b*, and two parallel side bars, *c*, so that a long slot, *f*, is provided vertically and longitudinally in the said frame E. The frame E is provided with stirrups *g*, each of which has a vertical stud or pin, *a'*, the relation of which to the bars or sides *c* of the frame E is more clearly shown in Fig. 2.

F is a horizontal bar, in which are holes or openings through which are passed the studs *a'*, so that said bar is seated at its ends on the stirrups *g*, and consequently supported within and vertically through the slots *f* of the frame E. This bar F supports the vertical standards G of the gripping mechanism, said standards having at their lower ends a shoulder, *h*, which forms a part of the gripping device, while at their upper ends they support a pivoted eccentric tooth-sector, I, which latter gears into an opposing, but similar, sector, J, and pivoted, as shown at *a**, to the upper end of the vertically-moving bar K of the grip, which said bar K carries the horizontal bar or shoulder *i* of the grip. Capable of vertically sliding within the bar K is the bar *m*, which carries at its lower extremity a pulley or roller, N.

The arrangement of the vertical standards G, the bar K, the bar *m*, the pulley N, and the sectors I and J may be the same as represented in the patent heretofore granted me, dated April 28, 1884, No. 316,670, and therefore requires no further specific description, either as to construction or operation. Such parts may, when desired, be substituted by others capable of producing like results. The grip mechanism, being suspended upon the stirrups *g* within or upon the frame E, will of course swing upon the axis of the movement of the said frame, so that when the said frame is turned upon its axis in one direction the lower part of the grip mechanism—that is to say, the part which is in operation for cable

railways—connects with the drafting-cable, and will be swung outward from said cable or inward to it, as the case may be. Extended through the tubular shafts *a* are the shafts *r*, the inward ends of which connect with the adjacent ends of a longitudinally-sliding frame, L, which frame L is smaller than the frame E, and of course shorter than said frame E, corresponding substantially in structure therewith, having two side bars, *c'*, between which is a vertical slot. This frame L is open at the top and bottom, so that its interior is substantially a vertical and longitudinal slot. The said frame L is placed within the slot *f* of the frame E, and its sides so substantially correspond in position with the sides of the frame E that the frame L is prevented from turning axially within the frame E; but, inasmuch as it has the same axis of movement, the said frame E will readily turn axially therewith.

It should be remarked that the parts are so proportioned that the standard G of the grip mechanism is passed through and within the sliding frame L, as well as through the frame E, as hereinbefore explained.

The cam-tooth sectors I and J are duplicated on opposite sides of the vertically-sliding bar K, and each of the lower sectors, J, is provided with a laterally-projecting pin, *e'*, these pins being more fully represented in Fig. 1. In each of the sides *c'* of the frame L is a vertical slot, *f'*, into which the adjacent stud or pin *e'* projects, as represented more clearly in Fig. 3. When the sliding frame L is pushing in one direction by the power applied to the shaft *r*, a corresponding movement is given to the lower arm of the sectors J, so that when the sectors are moved in one direction a sliding bar, K, will be forced downward as the longer portions of the sectors I and J are brought vertically coincident, while said bar will be permitted to rise when the said frame is moved in the opposite direction to bring the shorter arms of the said sectors I and J vertically coincident. A shaft, *s*, is provided with vertical brackets *g'*, which support a horizontal bar, M, which carries at or near its middle a vertical plate, N', which has in it an inclined slot, *h*, into which projects a stud, *i'*, from the adjacent side of the pulley carrying bar *m*, so that when the rod *s* is moved in one direction the inclined slot *h*, acting upon the stud *i'*, will raise the pulley-carrying bar *m*, and when moved in the opposite direction will permit the same to descend. By these means the pulley, the function of which is to lift the cable in the manner well understood in the art, is operated in due time and has relation with the gripping devices.

It will be observed that, the gripping mechanism being carried on the axial movable frame E, the gripping devices may be swung around the axis of said frame, outward to remove the same from the cable and inward when it is required to connect the grip devices with the cable; also that the frame L, having its axis of movement coincident with the axis of the movement of the frame E, enables the various parts to be operated without interference from a change of position with the frame E and its adjuncts, incident upon its being turned on its axis, as hereinbefore explained.

In order to give the requisite swinging movement to the frame E, one of the tubular bearings *a* thereof has placed upon it worm-wheel A', as more fully represented in Figs. 1, 3, and 4. Into this gear a worm, B', meshes, the bearings of which are suitably provided in the frame C, and the upper end of the shaft *m'* of which is provided with a sprocket-wheel, C', from which, to a similar sprocket-wheel, D', at the front end of the frame D, is extended a chain, E'. The sprocket-wheel D' is provided with a vertical shaft, F', having at its upper extremity a suitable hand-wheel, G', so that by turning said hand wheel in one direction or the other the motion transmitted from the sprocket-wheel D' through the chain E' to the sprocket-wheel C', and thence through the worm-wheel B' and the worm-wheel A' to the shafts *a* and the frame E, gives the requisite axial or swinging motion to the frame E, and consequently to the gripping devices, the latter being swung to or from the cable, according as the hand-wheel is turned in one direction or the other.

The grip-working mechanism shown in Fig. 6 is duplicated at the opposite end of the car. The chain extends from the sprocket-wheel C' lengthwise of the frame C until passed around the other sprocket-wheel D', this being of course easily accomplished when the sprocket-wheels and the adjacent parts are duly placed at the opposite ends of the frame D*, as hereinbefore explained.

To give the requisite longitudinal movement to the frame L, one of its tubular shafts *r* has swiveled upon its extremity a clasp, *g'''*, to which is attached the lower extremity of a lever, H', which is pivoted to *a''*, said lever being preferably provided with a pawl, *b''*, and affixed to ratchets *c''*, whereby its retroactive movement may on occasion be prevented. By moving this lever the tubular shafts *r*, and consequently frame L, may be drawn longitudinally in one direction or the other, as occasion requires, to effect the operation of the said frame L, as hereinbefore explained.

To give the requisite movement, the shaft *s*, which is hereinbefore explained, passes through the tubular shaft *r*, and connects with the brackets *g'* and the bar M. The said shaft *s* has one extremity pivoted to the lower arm of an elbow-lever, R, the pivot of which is indicated at *d*, said lever and its immediate adjuncts being represented in Fig. 6. To the upper arm, *e''*, of the elbow-lever R is pivoted a vertical sliding rod, *u*, which passes through a suitable vertical opening or slot in the adjacent part of the car-frame D*, and is provided with a foot-plate, *w*, at its upper end. This rod *u* is

provided with a tooth, f'', which engages with teeth or notches g'' on a fixed bracket attached to the frame $D^{\times}$. A spiral spring and spirally swung is preferably placed underneath the foot-plate w and around the rod u, to facilitate its retention in position. A brakeman or operator by placing his foot upon the foot-plate w can swing the latter, so that the tooth f'' is disengaged from the notches or teeth g'', and then forcing downward the rod u actuates the elbow-lever R to move inward the shaft s, thereby causing the inclined slot h in the plate N′ to raise the bar m, and lifting the pulley N to raise the cable in the due relation to the gripping devices. By releasing the foot-plate w the spiral spring h'' draws upward the rod u and reverses the movement of the shaft s, consequently the movement of the bar m and the pulley N.

The connection of the parts represented in Fig. 3 with those represented in Fig. 6 is clear, if it be borne in mind that the right-hand end of the tubular shaft r, as shown in Fig. 3, connects in a straight line with the left-hand end of the same shaft, r, as represented in Fig. 6, and that the same applies to the shaft s. The ratchet c'' is pivoted at one end and arranged to be bolted fast at the other, as shown in n'' in Fig. 6, and the lever H′ has its lower part constructed with a socket, r'', which permits the removal of the upper and main length of the lever when desired, so that by thus removing the lever and turning the ratchet c'' around its pivot in the position represented in the dotted outline in Fig. 7 the said parts may be got out of the way when desired.

It is to be observed that the devices for actuating the shaft s and the tubular shaft r are duplicated at the opposite ends of the frame D^{*}, so that the said shafts and the parts to be operated thereby may be actuated from either end of the car, as desired.

What I claim as my invention is—

1. The combination, with a supporting-frame carried by the axles of a car or vehicle, of the frame E, having axial bearings, a grip mechanism carried by said frame E and arranged to work vertically therethrough, the stirrups connecting the grip mechanism with the frame E, and mechanism for separately actuating the gripping jaws or shoulders and the pulley of the grip, said mechanism being capable of turning with the frame E around the axial line thereof, whereby provision is made for swinging the grip mechanism to and from the driving-cable, substantially as and for the purpose herein set forth.

2. The combination, with a supporting-frame carried by the axles of a car or vehicle, of the frame E, axially supported on tubular shafts or bearings, a grip mechanism carried by said frame E, the longitudinally-movable frame L, arranged parallel or coincident with frame E and axially supported coincident therewith, a grip mechanism carried by the frame E, and connecting devices for transmitting movement from the frame L to the gripping mechanism, whatever the inclination from the vertical of frame E, substantially as and for the purpose herein set forth.

3. The combination, with a supporting-frame carried by the axles of a car or vehicle, of the frame E, tubular bearings or shafts a, axially supporting said frame E, the frame L, having slots f', and arranged for longitudinal movement parallel or coincident with the frame E, the tubular shafts r, supporting said frame L in the axial line of the frame E, eccentric sectors I and J, pins or studs e' in sectors J, the standards G, and vertical bar K, substantially as and for the purpose herein set forth.

4. The combination, with a supporting-frame carried by the axles of a car or vehicle, of the frame E, tubular bearings or shafts a, axially supporting said frame E, the frame L, carrying the plate N′, having the inclined slot h, and the pin or stud i' of the pulley-carrying bar m of a gripping mechanism carried by the frame E, substantially as and for the purpose herein set forth.

5. The combination, with a supporting-frame carried by the axles of a car or vehicle, of the frame E, tubular bearings or shafts a, axially supporting said frame E, the frame L, having slots f, the shaft s, carrying the plate N′, provided with the inclined slot h, the tubular shafts r, supporting the frame L in the axial line of the frame D, the eccentric sectors I J, the studs of pins e' on the sectors J, and the pin or stud i' of the pulley-carrying bar m of a gripping mechanism carried by the frame E, substantially as and for the purposes herein set forth.

6. The combination, with a supporting-frame carried by the axles of a car or vehicle, of the frame E, the axial tubular bearings or shafts a, a grip mechanism carried by said frame E, a sliding frame, L, the tubular shafts r, supporting the said frame L in the same axial line as the frame E, devices for transmitting motion from the frame L to the movable parts of the grip mechanism, and a chain and sprocket-wheels for transmitting motion from a suitable hand-wheel to the tubular bearings or shafts a, substantially as and for the purpose herein set forth.

7. The combination, with a supporting-frame carried by the axles of a car or vehicle, of the frame E, the axial tubular bearings or shafts a, supporting said frame E, a gripping mechanism carried by said frame E, a sliding frame, L, the tubular shafts r, supporting said frame L, on the same axial line as the frame E, devices for transmitting motion from the frame L to the movable parts of the grip mechanism, and a lever having a swiveled connection with the tubular shaft r, to give longitudinal movement thereto, irrespective of the axial movement of said shaft r, substantially as and for the purpose herein set forth.

8. The combination, with a supporting-

frame carried by the axles of a car or vehicle, of the frame E, the axial tubular bearings or shafts *a*, the standards G, bar K, and pulley-carrying bar *m*, having stud or pin *i'* of a grip carried by the frame E, the frame L, having slots *f'*, tubular shafts *r*, supporting said frame L on the axial line of the frame E, shafts *s*, carrying plate N', having the inclined slot *h*, eccentric sectors I and J, studs or pins *e'* on sectors J, and a lever arranged to give longitudinal movement to the shafts *s*, substantially as and for the purpose herein set forth.

RENALDO SOLANO.

Witnesses:
EDWARD D. SMITH,
JOSIAH T. LOVEJOY.