(No Model.) 3 Sheets—Sheet 1.

C. A. HARVEY.

GRIP FOR CABLE RAILWAYS.

No. 347,597. Patented Aug. 17, 1886.

FIG. II.

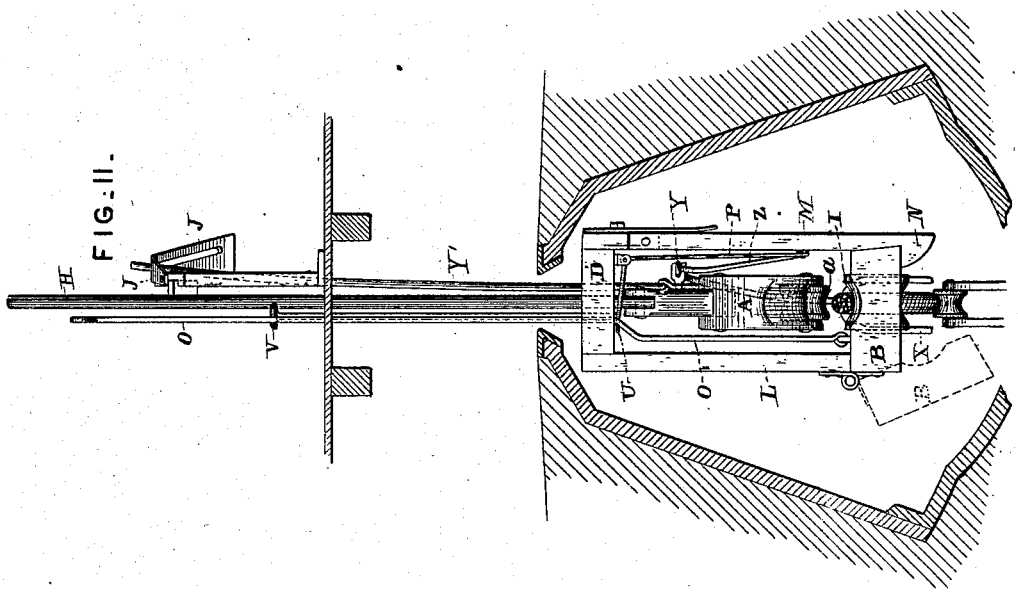
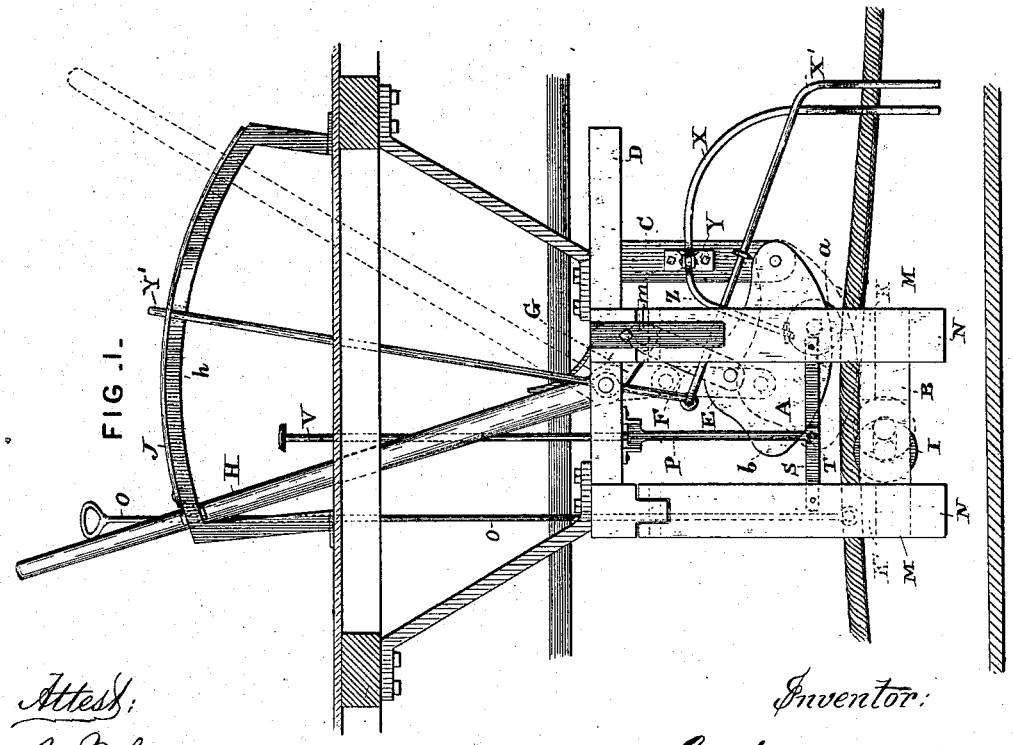


FIG. I.



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Attys

(No Model.)

3 Sheets—Sheet 2.

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FIG. IV.

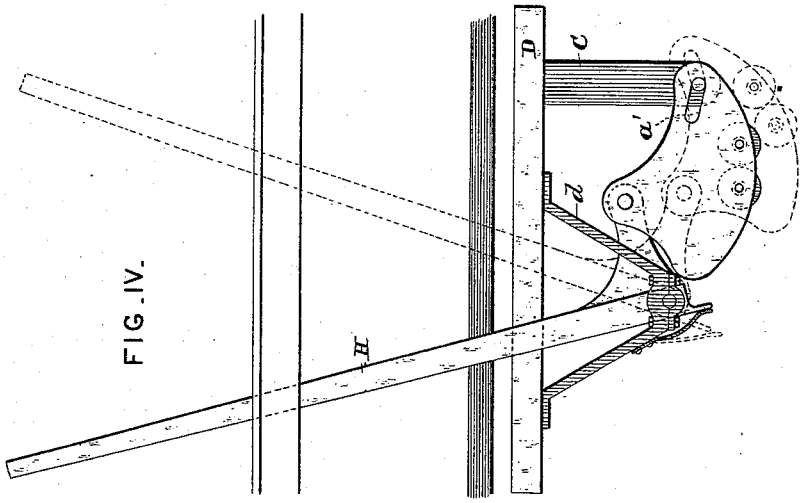
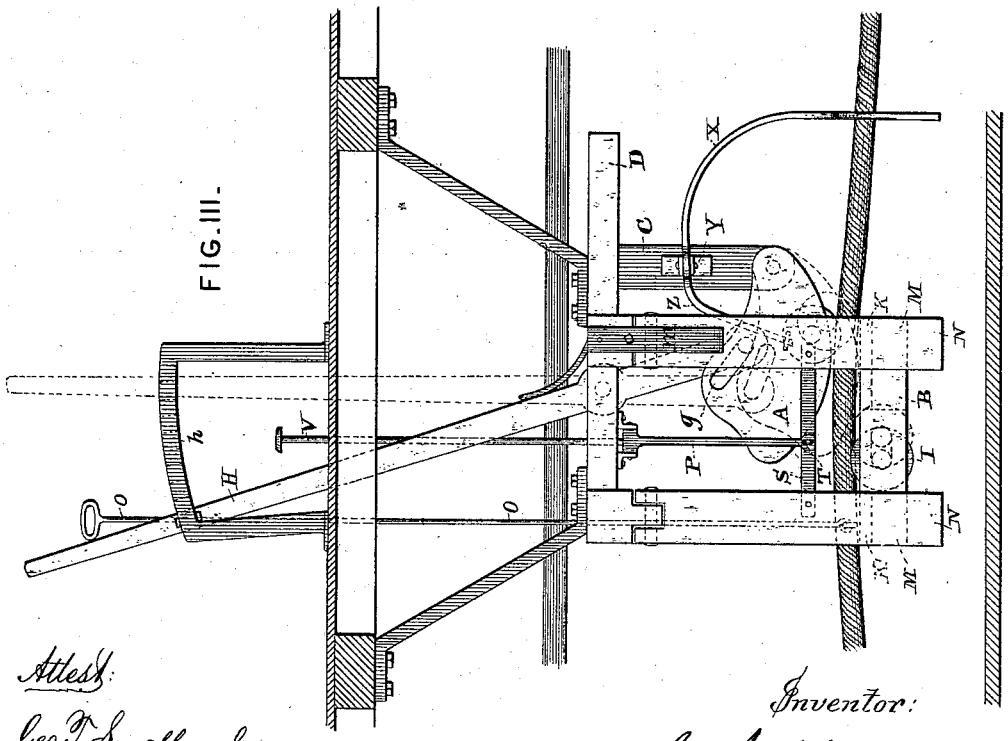


FIG. III.



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3 Sheets—Sheet 3.

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FIG _V_

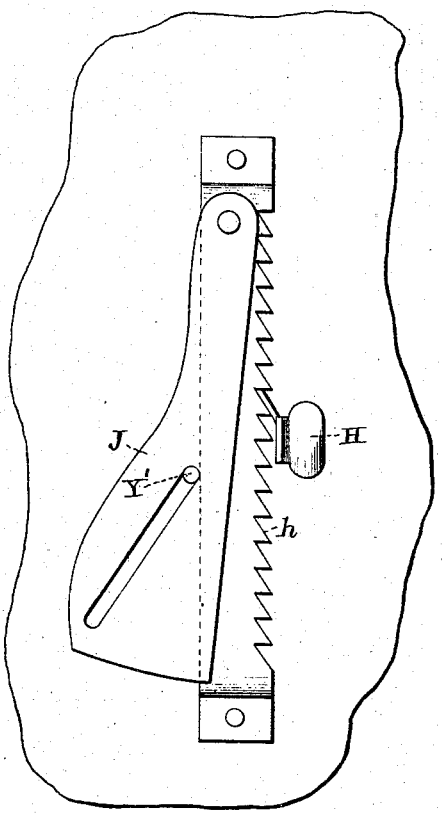


FIG _VI_

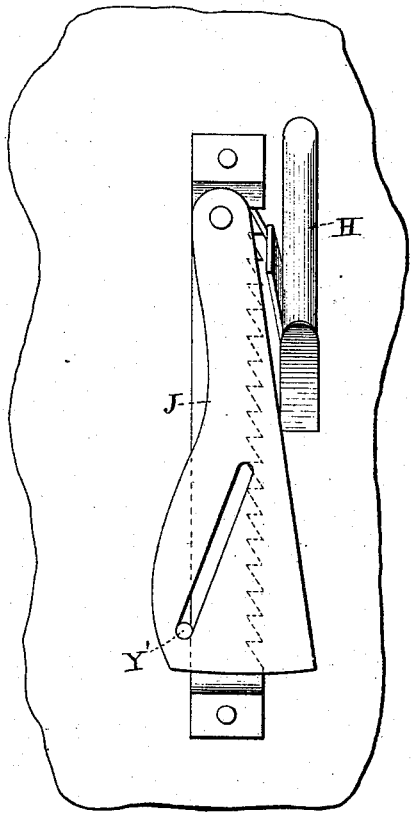
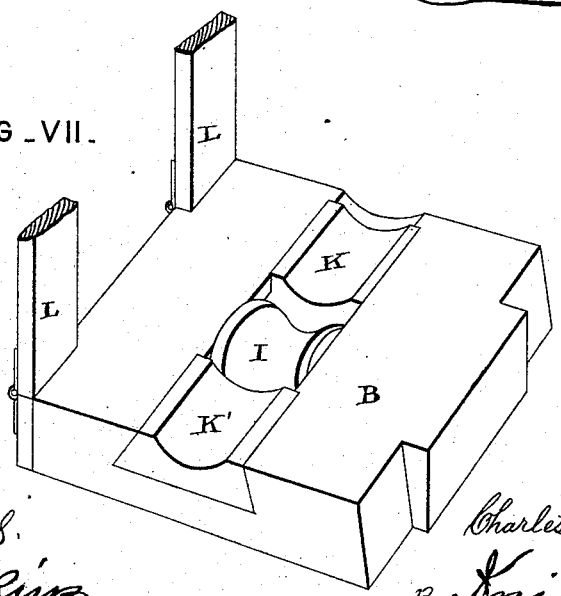


FIG _VII_



Attest.
Geo. T. Smallwood.
F. A. Hopkins.

Inventor
Charles A. Harvey.
By Knight Bros. Attys.

UNITED STATES PATENT OFFICE.

CHARLES A. HARVEY, OF WASHINGTON, DISTRICT OF COLUMBIA.

GRIP FOR CABLE RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 347,597, dated August 17, 1886.

Application filed June 3, 1886. Serial No. 204,054. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. HARVEY, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Grips for Cable Railways, of which the following is a specification.

The object of my invention is to provide a grip which shall be very easily and quickly manipulated in its application to and release from the cable, which may be made to grip gradually or instantaneously and to be instantly released, and with capacity of great power, and an absolute grip of the most tenacious character; and also to provide a quick and easy mode of attaching and detaching the cars to and from the cable, and an automatic release of the cable when encountering dangerous obstacles.

In the accompanying drawings, Figure I is a side elevation of the device. Fig. II is a front view of the same. Figs. III and IV are side elevations illustrating the device under modified forms. Fig. V is a plan or top view of the operating-lever and its holding-rack and discharging device, showing the positions of the parts when the grip is on. Fig. VI is a view of the same parts, showing their positions when the grip is automatically released. Fig. VII is a detached perspective view of the hinged platform forming the lower jaw of the grip.

A represents a wedge or shoe with circular or curved face, having a friction-roller, *a*, inserted in its face a little forward of the center, and a groove on its face from that point backward to its heel *b*. The narrow point of the shoe is pivoted to a fixed standard, C, which is firmly secured to the plate D, and the wide end is pivoted at its upper side, E, to the lower end of a toggle-joint, F, the upper part of the toggle G being the lower end of a lever, H, which operates the grip, and is pivoted to or in the plate D.

B represents a bottom platform, upon which the cable rests, in which is a friction-roller, I, having its axis in a slot, which allows it to slide forward when the cable is pressed down upon it by the shoe from above, so that its flanges rub against a bottom shoe-plate, which acts as a brake upon it. Inserted in this platform are two grooved shoes, K K'—one on each side of the sliding friction-roller—the forward one of which, K, serves as a solid rest for the cable when under pressure of the shoe above, thus affording a very tenacious grip.

When the grip is to be used, the lever H is pulled forward, so as to straighten the toggle-joint, thus depressing the upper shoe to the position shown in the dotted lines in Fig. I until it comes in contact with and completes the grip-hold upon the cable. When, by the action of the lever H, the shoe is depressed, its first contact with the cable is the friction-roller *a*, and the pressure upon the cable begins at that point, while simultaneously with it the friction-roller I in the platform beneath the cable is so pressed as to force its flanges against the edge of the lower shoe-plate, K, which then acts as a brake upon it, and thus sufficient grip is brought upon the cable to give a gradual initial movement to the car, which is followed by a still further depression of the shoe, when the friction-roller contacts are passed and the cable is in the firm grip of the solid heel of the upper shoe, and the solid under shoe, K, in the platform.

Care should always be had in construction and adjustment, so as to secure the above-described action of the friction-rollers and of the solid parts of the shoes upon the cable.

The bottom platform, B, is secured to the plate D by strong hangers L L on one side, which are rigid at the point of connection with the plate, but are hinged at their lower ends to the platform. Opposite and corresponding to these hangers are two strong latches, M M, hinged at the top of the plate D, with the catches N N at the bottom passing under the bottom of the platform, to support that side of it.

When the cable is to be picked up, the platform, which hangs down upon its hinges so as to admit of the cable passing to its place, is pulled up into position by the rod O until the latches N N are dropped or sprung under the edge of the platform, and hold it firmly in place. The latches will drop into their places by gravity; but, to make their action quick and sure, a spring or springs, *m*, may be used to force them in.

When the car is to be detached from the cable, the platform may be instantly dropped, when the cable will fall out. The device for

doing this consists of a lever, P, pivoted to and under the plate D, having two arms, one of which extends outward to a bar, S, which is fastened at each end to the latches M M, and is attached to this by a rivet in a slot, T. The other arm, U, forming a right angle with it, extends along under the plate D, and close to it, and is in a position to be acted upon from above and pressed downward by a rod, V, which may be pushed and operated by the foot, thus throwing the latches back and out, allowing the platform to drop and the cable to fall out.

In order to guard against possible obstructions and accidents resulting therefrom, I have provided a device, which works automatically, to release and drop the cable when an obstruction is encountered. A lever, X Z, is pivoted near its middle by a vertical axis, Y, on a support beneath the plate D. The two arms of this lever project forward and backward, respectively, and also laterally, on each side of the fulcrum. The forward end, X, of said lever projects some distance in front of the grip, and is preferably adjusted to hang over and near the cable, while the rear end, Z, rests against or close to one of the connected latches M. It will be apparent that by reason of the lateral projection of the ends X Z of the lever on opposite sides of the vertical pivot or fulcrum of said lever, as well as forward and backward, the contact of the forward end, X, with any obstacle, forcing said end backward, will also move it sidewise and this will throw the rear end, Z, sidewise in the opposite direction, pressing the latches M outward, dropping the platform B, and thus releasing the cable.

X′ represents a slide-bar employed to release the grip-shoe A, and extending slightly in advance of the lever X, which operates on the lower jaw or platform, M. The slide X′ is jointed to the lower end of a lever, Y′, fulcrumed in the plate D, and extending upward through an oblique slot in a plate, J, lying upon and pivoted by its rear end to the rack-bar *h*, with which the lever H engages, to hold the grip closed. The effect of this device is that on encountering an obstacle the slide X′, being forced backward, will, through the movement of the lever Y′, throw the plate J sidewise, discharging the lever H from the teeth of the rack *h*, and preventing its re-engagement therewith, and thus releasing the grip from the cable. The platform K, being thus relieved of pressure, offers no frictional resistance to the outward movement of the latches M, which is effected by the action of the lever X, as already explained, to discharge the cable. While the releasing devices for the upper and lower grip-jaws are thus adapted to co-operate with good effect, it is apparent that either may be used without the other. It is also apparent that either or both of them may be located or may extend above the tunnel, so as to be acted on by obstructions above the surface of the ground.

I do not confine myself to the method herein described for manipulating and operating the toggle-joint and the grip-shoe, as it may be done by a rod or chain connecting the toggle with a lever, or its equivalent, placed at a distance from it where it shall seem necessary or desirable to so use it; or the toggle may be operated by an eccentric, placed behind it or in suitable connection with it. Neither do I confine myself to the form of latches or the manner of operating them herein described, as latches may be made to swing parallel with the platform, both swinging in the same direction, or in opposite directions, either toward each other or from each other, and operated either by a lever or by a toggle, or by both levers and toggles combined; or, instead of latches, the platform may be operated by rack and pinion or by levers.

The lever-arm G, instead of connecting with the shoe A by a link, F, may have a pin-and-slot connection, *g*, as illustrated in Fig. III, with substantially the same effect, the pin being in the lever and the slot in the shoe, or vice versa.

The grip-shoe A, instead of being secured at its point by a fixed pivot to the standard C, as shown in Figs. I and III, may be slotted at the point, as shown at *a′* in Fig. IV, and work upon friction-rollers, or on a pivot-pin fixed in the standard C, thus giving to the shoe a greater forward as well as downward movement. In operating the shoe by this adjustment of it, as in the modification shown in Fig. III, the lower arm or link, F, of the toggle-joint may be dispensed with, and in either case the arm G of the operating-lever may be in line with the upper arm, H, as in Fig. III, or at right angles thereto, as in Fig. IV, or oblique, as in Fig. I.

In the form of the device shown in Fig. IV an elbow-lever is employed, fulcrumed in a bracket, *d*, beneath the plate D, and pivoted at its extremity to the upper part of the heel end of the shoe A, so that the two pieces constitute a lever, a grip-shoe, and a toggle-joint, so combined as to reduce the whole to the lowest elements of simplicity.

It will be seen that my device for an efficient cable-grip combines the most powerful leverage principle known with the most direct application of it, and in the most simple and economical manner possible.

It is manifest that the invention is equally applicable to cable roads on bridges or other locations where tunnels are not used for the cable. In this case the plate D, to which the grip and operating mechanism are secured, may of course constitute or be at or near the level of the car-platform.

The eccentricity of the gripping face of the shoe A relatively to the pivot on which it turns gives it a wedge-like action, so that under the friction of the cable it grips more tightly the harder it is drawn.

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

1. A combined roller and positive grip having a pivoted shoe provided with one or more rollers which are brought to bear on the cable by a partial movement of the shoe toward the cable, and are carried out of action by a further movement thereof in the same direction, substantially as set forth.

2. A combined roller and positive grip, the jaws of which are each provided with one or more rollers which are brought to bear on the cable by a partial pressing together of the jaws, and are carried out of action by a further movement in the same direction, leaving the cable to be gripped between positive jaws.

3. The combination of the pivoted gripping-jaw A, provided with one or more friction-rollers, *a*, and the supporting-jaw B, on which the cable rests, hinged to admit of dropping and picking up the cable, as explained.

4. The combination of the hinged supporting-jaw B and the latches M, pressed into engagement therewith, substantially as herein shown and described.

5. The combination of the hinged supporting-jaw B, automatic latches M, and the trip T U V, for retracting said latches to discharge the cable, as explained.

6. A grip for cable railways, having a grip-shoe pivoted eccentrically to its working face, in combination with a lever jointed to the free end of said grip-shoe, substantially as described.

7. A grip for cable railways, having a shoe fulcrumed at one end and moved at the other end by a lever and toggle-joint connected directly thereto.

8. A combined roller and positive grip comprising fixed and movable jaws or shoes, one or more rollers mounted in slotted bearings, and a brake-surface, said movable shoe being so mounted that the movement of the cable causes the application of braking or retarding friction to said roller automatically by its movement relatively to the shoe in which it is mounted, substantially as set forth.

9. The combination of the hinged supporting jaw or platform B, latches M, and rod or chain O, for drawing the supporting jaw or platform B up into closed position, substantially as described.

10. The combination of the supporting jaw or platform B, latches M, and automatic discharging-lever X, substantially as and for the purposes set forth.

11. The slide X′, lever Y′, and plate J, for automatically releasing the upper grip-jaw, substantially as described.

CHAS. A. HARVEY.

Witnesses:
OCTAVIUS KNIGHT,
F. A. HOPKINS.