

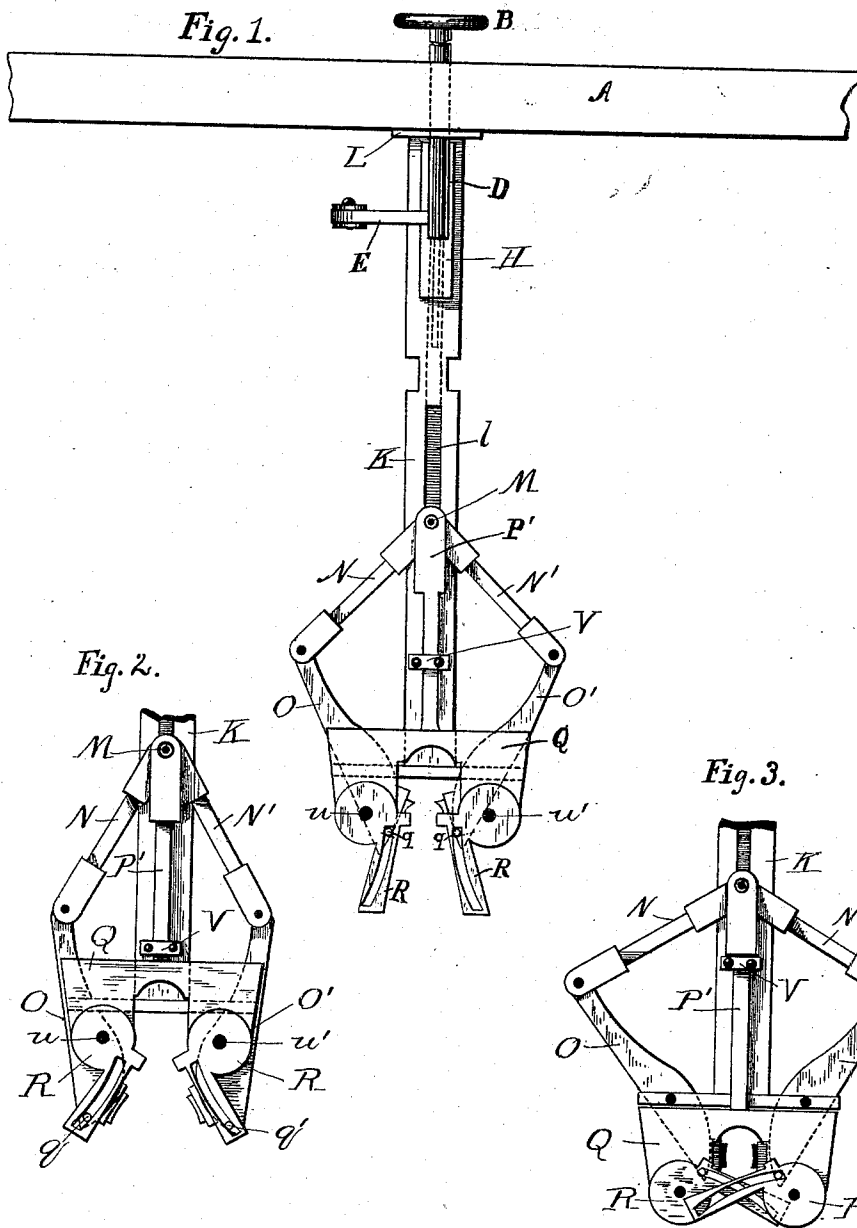
(No Model.)

2 Sheets—Sheet 1.

E. NELSON.
CABLE GRIP.

No. 542,489.

Patented July 9, 1895.



Witnesses:

C. L. Belcher

C. M. Catlin

By

Inventor

Elihu Nelson

G. H. Stockbridge
Att'y

(No Model.)

2 Sheets—Sheet 2.

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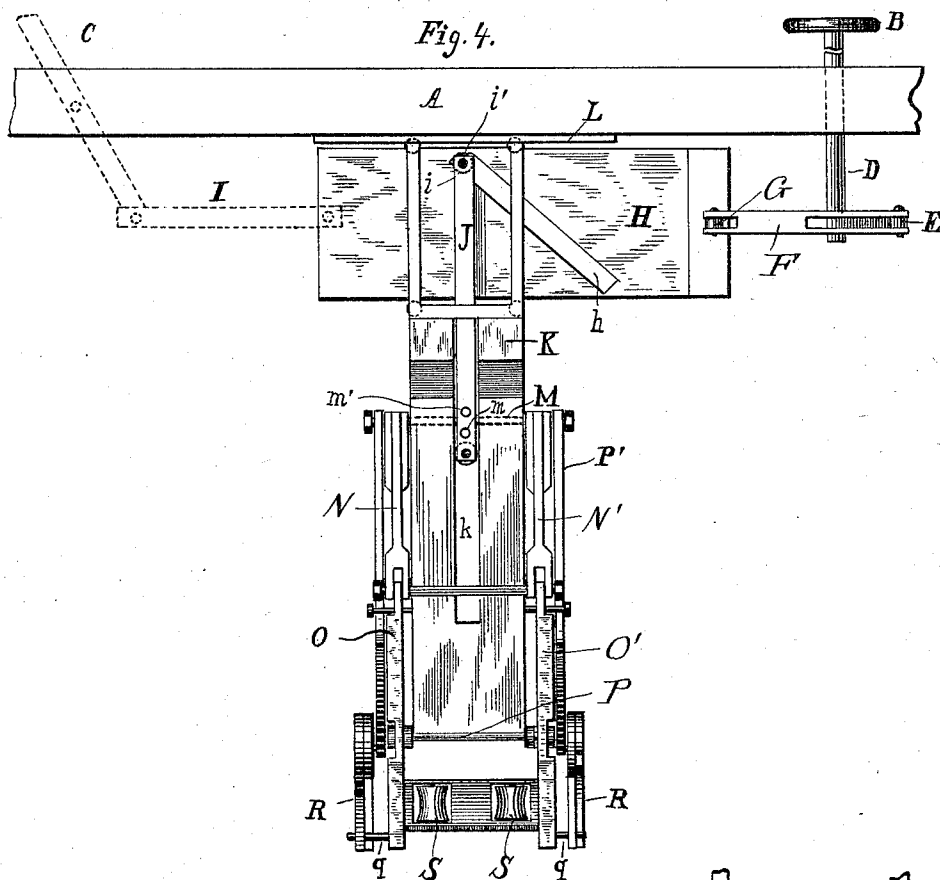


Fig. 5.

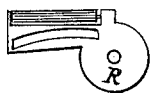


Fig. 6.

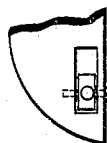
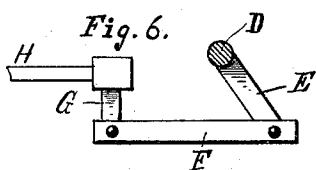


Fig. 8'.

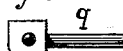
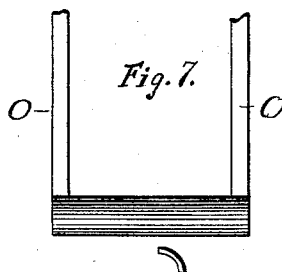


Fig. 7.



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UNITED STATES PATENT OFFICE.

ELIHU NELSON, OF NEW YORK, N. Y.

CABLE-GRIP.

SPECIFICATION forming part of Letters Patent No. 542,489, dated July 9, 1895.

Application filed March 20, 1894. Serial No. 504,430. (No model.)

To all whom it may concern:

Be it known that I, ELIHU NELSON, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Cable-Grips; and I do hereby 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.

The object of my invention is to provide a grip for use on cable-cars which shall be quick and easy in its action and shall afford a powerful grasp upon the cable, and shall be able to pick up and grip the cable either upon a straight portion of the road or upon a curve.

It often happens with the grips now in use that when the cable is once released it can only be picked up again with great difficulty, and it may be even beyond the reach of the grip so that outside means have to be employed for bringing the cable within the grasp of the gripping mechanism. Especially is this liable to be the case when the car stops upon a curve in the road. I have invented a gripping device which obviates the difficulties mentioned by providing in addition to the gripping mechanism proper fingers which are capable of being carried down under the cable and lifting it into position.

In order that others may be able to make and use my invention and to understand clearly its operation, I have illustrated it in the accompanying drawings, in which—

Figure 1 is an end elevation of my grip, the same being shown in a position about half way between its extremes of movement. Fig. 2 is a similar elevation of the main moving parts, the same being shown in their extreme position in an upward direction. Fig. 3 is a similar view, the parts being shown in their lowermost position. Fig. 4 is a side elevation of my grip. Figs. 5, 6, 7, and 8 are details.

In Figs. 1 and 4 my gripping apparatus is shown supported beneath the platform A of a cable-car, or rather beneath the bottom A of a car-body. The grip is operated either through the medium of a hand-wheel B or a hand-lever C. The shaft D of the hand-wheel runs through the bottom of the car and is connected below the car-body with a lever E, as clearly shown in Fig. 6. The said lever E

is joined by a link F to a rod or bar G projecting from a sliding plate H directly under the car-body. By turning the hand-wheel one way or the other the sliding-plate H can be operated longitudinally in either direction.

The hand-lever C is shown in Fig. 4 as being broken off at the top and as being connected below the car-bottom A with a bar I joined to one end of the sliding-plate H. It is manifest that the lever C may be used instead of the hand-wheel B for causing the longitudinal movements of the plate H. Ordinarily the hand-wheel B or the lever C will be used alternatively, but I may have both devices at hand so that either can be used at the will of the operator.

Now the sliding plate H is provided with a slot *h*, within which is a roller *i* supported upon a shaft *i'*, which joins two vertical bars J. The part *i'* may be regarded as the rivet which connects these bars, while the roller *i* is an antifriction device to guard against friction between the said rivet and the sides of the slot *h*. As the two bars J are on opposite sides of the plate H and connected together by the shaft or rivet *i'* through the slot *h*, there is no possibility of the parts becoming accidentally disengaged when in operation. The two bars J are similarly connected by a rivet at their lower end, and there is also present an antifriction-roller playing between the sides of a vertical slot *k* in a frame K, which is secured to a plate L on the bottom of the car. The upper portion of this frame may have solid sides or skeleton sides, as indicated in Fig. 4. Between the two bars J runs a horizontal rod M, the same being adapted to be moved up and down with the bars J as the latter reciprocates in the vertical slot *k*. To effect this movement of the rod M the latter is located between two cross bars *m m'* connecting the two bars J, and to permit this movement of the rod M there is provided a vertical slot *l* in the frame K.

I have already described how the sliding plate H can be reciprocated by the operation of either the hand-wheel B or the hand-lever C. The reciprocation of the said plates manifestly has the effect of moving the bars J up and down and with them the rod M. The movement of the bars J is effected by the roller *i* being pressed upon by the sides of the slot *h*

in the plate H, the said slot being angular for this purpose.

The main portions of the grip proper receive their motion from the rod M, and these 5 ports will now be described. They consist mainly of angular levers N N' O, O' (duplicated at opposite ends of the rod M,) the two former being pivoted directly to the said rod, and the two levers O O' forming a toggle connection with the levers N N' by being pivoted thereto and also to a cross-piece P upon 10 the bottom of the frame K. There is also a vertical bar P' pivoted to the rod M, and this vertical bar carries at its lower end the frame Q. The said frame is shaped generally like an inverted U and carries at the lower ends of the U pins *u u'*, which serve as pivots for the slotted fingers R R. The said slotted fingers are traversed by pins *q q'*, which lie in 15 the slots and are rigidly connected with the levers O O' at their lower ends. It will be seen from Fig. 8 that the said fingers are sometimes adjustably, and not rigidly, connected with the said levers, the purpose of which will appear later on. The slots in the fingers R 20 R are somewhat curved and the said fingers are moved into different positions by the action of the pins *q q'* upon the walls of the said slots.

The different positions of the fingers, as well as the different positions of the operating levers forming the toggle, are illustrated in Figs. 1, 2, and 3, Fig. 2 showing the uppermost position of the toggle-levers and the 25 lowermost position of the pins *q q'* in the slotted fingers R R. Fig. 1 illustrates the midway position of the levers and shows the pins *q q'* near the upper ends of the slots and illustrates how the position of the fingers R 30 R has been shifted by the action of the pins upon the slot-walls. In Fig. 3 the position opposite to that shown in Fig. 2 is illustrated, and the fingers are shown as having been brought past each other by the force of the 35 pins *q q'*, acting upon the ends of the slots in the fingers.

I should add that the fingers R R on the same end of the grip are arranged in different planes, so that one can pass by the other, as shown in Fig. 3. The grip-bars themselves 40 (one of which is illustrated in Fig. 7) extend across from the lower end of the bar or lever O on one side of the grip to the lower end of the corresponding bar or lever on the same side. The grip-bars are usually provided with 45 antifriction-rollers S S, as shown in Fig. 4. The fingers are also provided with rollers for preventing friction, as illustrated in Fig. 5. This is an alternative construction, but it is 50 the one which I prefer.

The action of the apparatus is as follows: Let it be understood that Fig. 2 illustrates the position of the grip when the cable is down and running freely without moving the 55 car. Then if the operator wishes to start the car he operates the hand-wheel B or the hand-lever C and moves the sliding plate H from

the position illustrated in Fig. 4 till the bars J have been carried down far enough so that the roller *i* rests at or near the bottom of the 60 slot *h*. In doing this he causes the fingers R R to pass through the evolutions illustrated in Figs. 1, 2 and 3 (the order of movements being read from left to right on the first sheet of the drawings) and makes the fingers first 65 pass down below the cable and then causes them to be drawn inward and raised for lifting the cable. Meanwhile the grip-bars have been caused to approach each other by the same operation, and when the cable has been 70 lifted to the proper position the grip is applied in an efficient manner.

From the foregoing it is evident that the grip can pick up and grasp the cable at any point without difficulty and that when the 75 grip is applied and doing its work the lifting-fingers are out of the way of any obstructions in the track of the cable.

The vertical bar P' is adapted to move within a guide V, secured upon the frame K. 80

In Fig. 8 I show one of the pins marked *q* so attached to the lower end of one of the levers as to have a power of being moved upward whenever the tightening of the grip is 85 so great that the pins would otherwise be struck by the ends of the fingers R R and the further movement of the grip be stopped. With the arrangement shown in Fig. 8 the pin will be struck, perhaps, but it will yield in an upward direction sufficiently far to allow the grip to be fully set. There would be 90 no need of such an arrangement under ordinary conditions.

What I claim is—

1. In a gripping mechanism, a vertically reciprocating bar connected to one end of a toggle system, and a pair of grip bars at the opposite end of said system, and pivoted cable-lifting fingers movable toward and from the 95 plane of the gripping surfaces, as set forth, said fingers being movable on axes independent of the pivots of the grip bars.

2. In a gripping mechanism, a frame having a vertical movement and a gripping apparatus having a rocking or horizontal movement, a projection upon the said gripping 100 apparatus and a finger mounted upon the said frame in a pivotal manner and being in line with the said projection, as set forth.

3. In a gripping mechanism, a frame or bar having a vertical movement a grip bar having a rocking movement, the two movements being simultaneous, in combination with a projection extending from the said grip bar, a finger pivotally mounted upon the said 105 frame or bar and being in line with the said projection, as set forth.

4. In a gripping mechanism, a frame or bar having a vertical movement and a grip bar having a rocking movement, the two movements being simultaneous, in combination 110 with a projection extending from the said grip bar, a finger pivotally mounted upon the said frame or bar and provided with a curved slot,

the said projection entering the said slot, as set forth.

5 In a gripping mechanism, a frame or bar having a vertical movement, and a grip bar having a rocking movement, the two movements being simultaneous, in combination with a pin projecting from the said grip bar, a finger pivotally mounted upon the said frame or bar and having a curved slot, the
10 said pin being adjustably secured to the said grip bar and being adapted to enter the said slot, as set forth.

6. In a gripping mechanism a frame or bar having vertical movement, two grip bars hav-

ing a rocking movement, the said movements 15 being simultaneous in combination with projections extending from the said grip bars and fingers pivotally mounted in different planes upon the said frame or bar, each finger in line with one of the said projections, 20 as set forth.

In testimony whereof I have signed my name, in the presence of two witnesses, this 19th day of March, A. D. 1894.

ELIHU NELSON.

Witnesses:

G. H. STOCKBRIDGE,
JOHN T. MURPHY.