

No. 880,869.

PATENTED MAR. 3, 1908.

O. A. ELLIS.

TRACTION APPARATUS FOR STATIONARY CABLES.

APPLICATION FILED AUG. 2, 1906. RENEWED JULY 16, 1907.

3 SHEETS—SHEET 1.

Fig. 1.

Fig. 3.

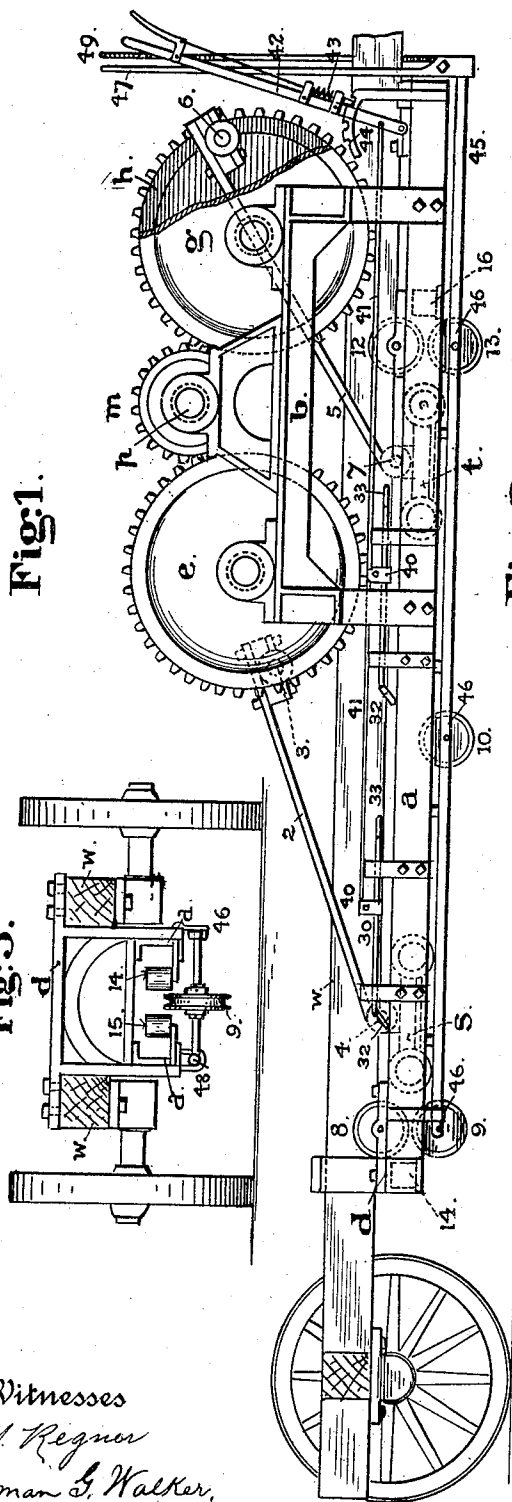
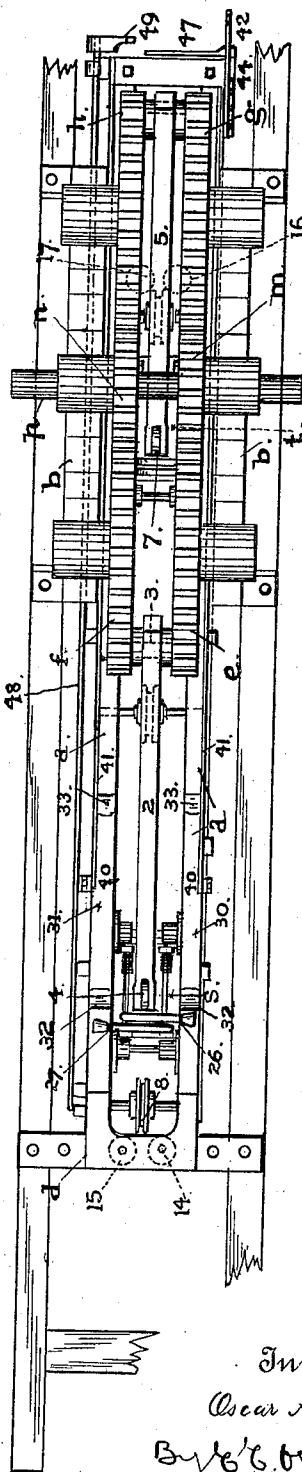


Fig. 2.



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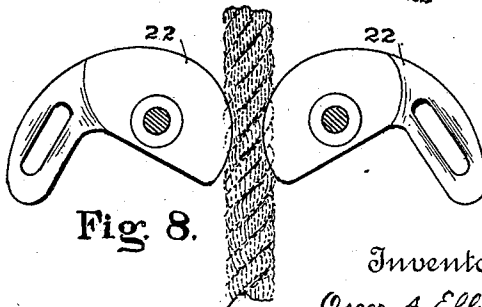
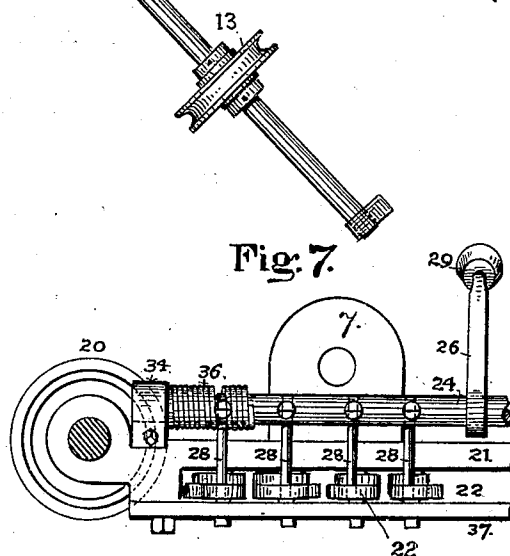
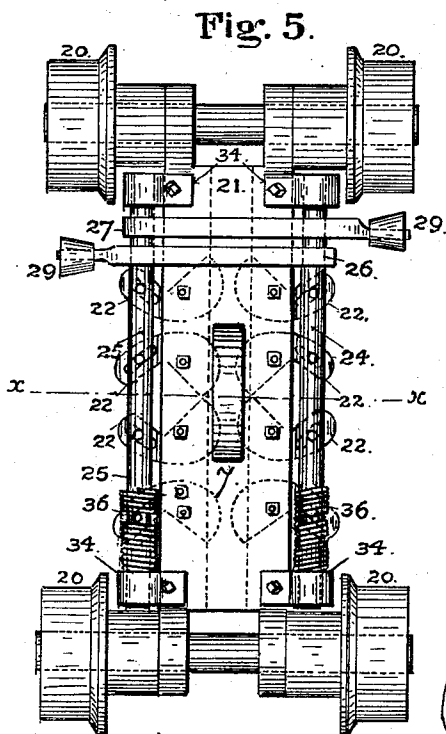
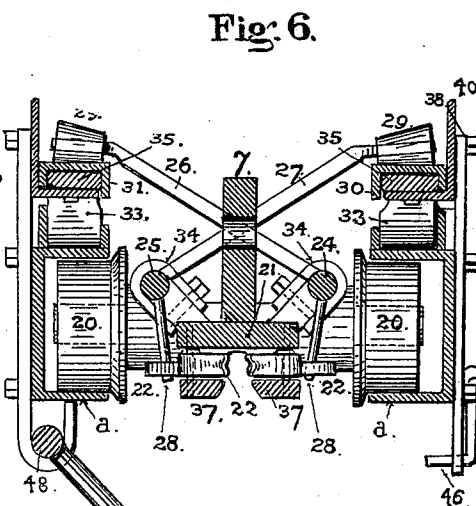
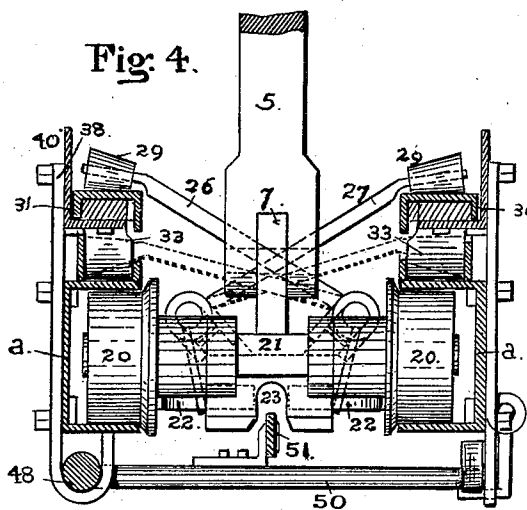
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

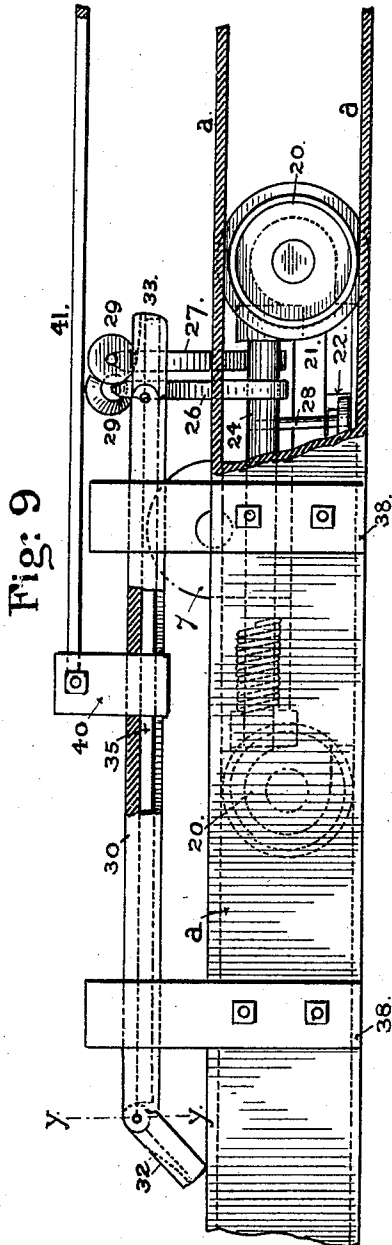


Fig: 9

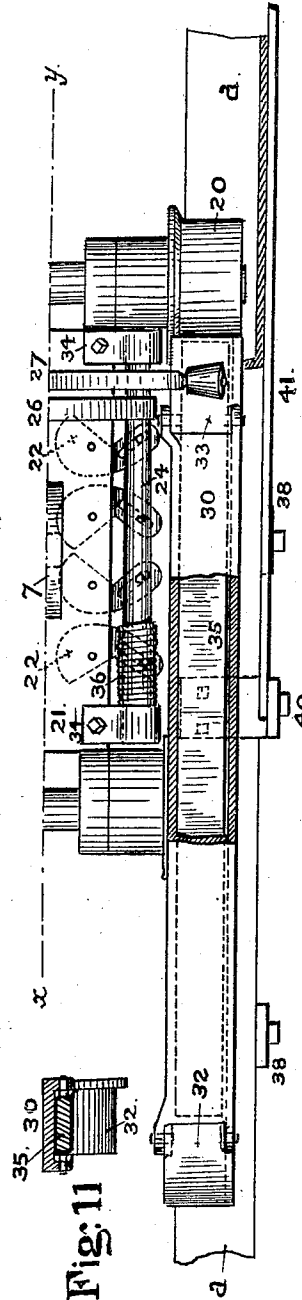


Fig: 10



Fig: 11

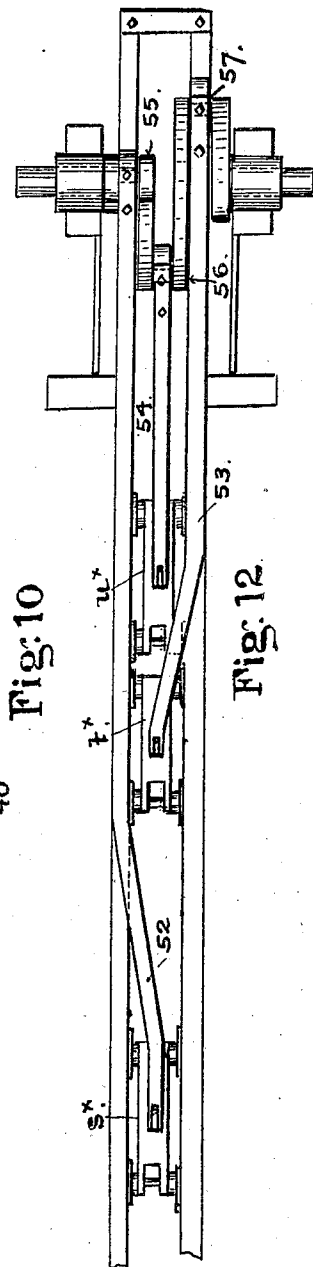


Fig: 12

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UNITED STATES PATENT OFFICE.

OSCAR A. ELLIS, OF SAN FRANCISCO, CALIFORNIA.

TRACTION APPARATUS FOR STATIONARY CABLES.

No. 880,869.

Specification of Letters Patent.

Patented March 3, 1908.

Application filed August 2, 1906, Serial No. 328,954. Renewed July 16, 1907. Serial No. 384,110.

To all whom it may concern:

Be it known that I, OSCAR A. ELLIS, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Traction Apparatus for Stationary Cables, of which the following is a specification.

This invention relates to means or devices for connecting cars or vehicles to cables for drawing heavy loads.

The invention has for its object to provide an improved traction device or apparatus for use where speed is a secondary consideration, and of such character that the apparatus is applicable for use either in a stationary position for hauling on a cable hand over hand, or by being mounted on a wheeled truck it can be used to propel the truck, or cars coupled to it, by hauling hand over hand upon a stationary cable.

The invention embraces an improved gripping-device having reciprocating movement in guides, and adapted by its construction to automatically take hold of the cable in one direction of the reciprocating movement and to release its hold on the cable in each return movement, whereby the gripping-device alternately grips and lets go its hold on the cable while moving backwardly and forwardly in the guides.

The invention embraces, further, the combination of a plurality of hand over hand gripping-devices and means for reciprocating them in opposite directions from a common power-actuated shaft, whereby one gripping-device will take hold and pull on the cable as another of the gripping-devices lets go.

In connection with the gripping-devices having reciprocating movement in guides, the invention includes novel means for throwing them into or out of action, and for changing at will the direction in which they will operate to seize and haul on the cable.

The invention includes, further, certain novel parts and combination of parts and mechanism producing an improved traction-apparatus for hauling on a cable hand over hand.

The nature of these improvements and the manner in which I proceed to construct, apply and carry out my invention will be understood from the following detailed description in which reference is had to the accompanying drawings.

Figure 1 is a side-elevation of a traction-apparatus embodying my invention, showing the same mounted on wheels to work on a stationary cable. The truck-frame and wheels on one side are omitted, and the rear end of the truck is broken off. Fig. 2 is a plan or top-view of Fig. 1. Fig. 3 is a front-view of the truck, showing the cable-carriers and guide-rollers at the front of the truck; the gripping-mechanism being omitted. Fig. 4 is a front-elevation, on an enlarged scale, of one of the gripping-devices in working position in the stationary guides, which are represented in sectional view; the section being taken transversely through the stationary-frame and the switch-rails. Fig. 5 is a plan or top-view of the traveling gripping-device removed from the stationary-frame of the apparatus. Fig. 6 is a transverse section through the traveling gripping-device and the stationary guides and switch-rails, the section through the gripping-device being taken on the line $x-x$ Fig. 5. Fig. 7 is a side-elevation of Fig. 6, taken from the right side. Fig. 8 is a top-view, on an enlarged scale, of one set of the gripping-jaws. Fig. 9, is a side-elevation on an enlarged scale of a portion of a track-rail and the switch-rail above it, showing parts broken away and the gripper carriage in working position, with the jaws closed on the cable. Fig. 10 is a half-plan, on one side of the center-line $x-y$, of the parts shown in Fig. 9. Fig. 11 is a cross-section through the switch-rail at the hinge-joint, the section being taken at $y-y$ Fig. 9. Fig. 12 illustrates the manner of connecting a set of three gripping-devices to the same crank-shaft.

The principal parts of the apparatus comprise stationary guide-rails $a a$; a plurality of gripping-devices $s-t$, fitted to travel longitudinally with a reciprocating movement and a limited length of travel on the guide-rails; a system of connecting-rods 2—5 and cranks 3—6 arranged to give reciprocating movement to the gripping-devices simultaneously in opposite directions; and switching means comprising stationary switch-rails 30—31 and adjustable switch-points 31—32, and means for setting the same into and out of operative position. These parts and mechanism are carried in a frame of which the guide-rails form part; the frame being adapted by its construction to be set in stationary

position for hauling on a cable, or to be mounted on wheels to operate in connection with a stationary cable laid on the ground.

The gripping-device involves in its construction a novel means for closing the gripping-jaws on the cable and for throwing it off automatically by the reciprocating movement of the gripping-device, and at the end of each travel or extent of its movement in the guides. The construction of the gripping-device will be understood from Figs. 4 to 11 inclusive.

The gripping-jaws 22, are arranged in pairs, with those of each pair pivotally set between the plates 21—37 composing the body of the gripper-carriage. Flanged wheels 20 fixed on axles at opposite ends of the carriage travel between the top and bottom flanges of the guide-rails *a*, that form a track or bearing-surface both above and below the wheels.

The means for closing and opening the jaws to grip or release the cable consist of a rock-shaft 24 set in bearings 34 along the right side of the carriage directly over the projecting slotted arms of the eccentrics 22 on that side, and a rock-shaft 25 on the opposite side, carried in the same manner. The two rock-shafts and the appendages by which they are connected with the gripping-jaws and are actuated by the switch-rails are the same in every respect, so that the description of one will apply to the other.

The rock-shaft is connected to each jaw 22 by a separate pin 28 fixed in the rock-shaft, from which it extends downwardly at right angles into the slot in the gripping-jaw. The tension of the coiled-spring 36 surrounding the rock-shaft near one end exerts sufficient torsional force thereon to maintain the pin 28 normally perpendicular, or approximately so, in which position it will hold the jaw 22 open. On the other hand, an arm 26 fixed on the rock-shaft 24 and a similar arm 27 on the opposite rock-shaft, operate to put the springs 36 in greater tension by turning the rock-shafts when the arms are set in an elevated position. The extent of such angular movement is sufficient to close the jaws 22 on the cable. The effect of raising the arms 26—27, therefore, is to close the gripping-jaws and hold them in that position with a proper degree of pressure upon the cable from opposite sides. The jaws by virtue of their eccentric shape are caused to grip the cable with increasing force as the pulling force or strain of the gripping device on the cable becomes greater under the strain or resistance of the cable.

The switching means, or that part of the mechanism which opens and closes the jaws by acting on the arms 26—27 of the rock-shaft, is controlled from one end of the truck through a hand-lever 42.

The stationary switch-rail 30 is supported

above the track-rail by the standards 38, leaving room between it and the track-rail for the roller 29 on the end of the arm to pass under and clear the switch-rail when the roller is traveling on the track-rail and the arm is in its lowest position.

At each end of the switch-rail a hinged switch-point loosely attached by its hinge-joint, and of a length sufficient to rest at the outer end of the track rail, extends from that point downwardly, thereby forming an inclined extension of the switch-rail at each end. In such inclined position of the switch-point as the roller 29 strikes it from behind while the gripper-carriage is moved in one direction, and the roller is traveling on the track-rail, the switch-point will lift and allow the roller to pass under. On the return-movement of the carriage the roller 29 will ride up the incline, and the roller-carrying arm will be elevated and will be held up as long as its roller is traveling on the switch-rail. The switch-points 32 at one end and the corresponding switch-point 33 at the opposite end of the switch-rail are brought to the horizontal position in line with the stationary rail by means of a slide bar 35 fitted to slide in the groove or channel in the bottom of each rail; and when moved longitudinally in one direction the bar will lift and hold up the switch-point at one end by sliding under the hinge. The bar is of such length, however, that it will lie within the hinge-joint of one switch-point when the opposite end of the bar is under the hinge of the other switch-point. The effect of moving the bar 35 in one direction, therefore, is to elevate the switch-point at that end towards which the bar is moved, and at the same time allow the opposite switch-point to drop into its inclined position. The bar 35 is of such length also that it will act to hold up both switch-points at the same time, when it is set in the middle position, thus allowing the gripper setting arms 26—27 to pass under the switch-rails in both directions of travel, and causing the grippers to travel on the cable without taking hold. The bar 35 is connected with the hand-lever 42 by a slide 40 and a connecting rod 41.

The switch-rail 30 and the corresponding rail 31 on the opposite side of the frame are the same in construction and arrangement. The slide-bars 35 of the two rails are so connected as to be controlled by the same hand-lever. The elevated position of the arms 26—27 when the jaws are closed on the cable is represented in full lines in Figs. 4 and 6, where it will be seen that the rollers 29 are traveling on the switch-rails 30—31. The position which the arms take after they pass off the ends of the switch rail and drop on the track-rail for the return movement is indicated by dotted lines in Fig. 4.

The switch-setting lever 42 is controlled as

to position by a notched segment 44 and a spring-held detent of well-known construction.

The reciprocating mechanism represented in Figs. 1 and 2 illustrates one means of applying power to a set of two gripping-carriages arranged to travel in opposite directions on the same track or guides.

A pair of gear-wheels $e-f$ connected by a common crank-pin 3 are geared into a power-actuated shaft p , by two pinions $m-n$, and a corresponding pair of wheels $g-h$ connected by a crank-pin 6 placed on the opposite side of the same shaft are driven by the same pinions; the two cranks 3-6 thus being driven in contrary directions, but with the same length of throw.

The gripping-device s which is connected with the crank 3 by the rod 2, will be moved in the contrary direction to the gripping-device t which is actuated by the crank 6 through the connecting rod 5, so that while one gripper is hauling on the cable the other gripper is detached and is sliding on the cable towards the first mentioned gripper, preparatory to closing on the cable as the jaws on the acting gripper are loosened and the cable is released.

Power can be applied to the driving-shaft p in any suitable manner from an engine or motor mounted on the truck of the machine. The manner of making the necessary connection between the shaft p and an engine being within the ordinary skill of a mechanic, no description of the same is considered necessary in this specification.

Fig. 12 of the drawing illustrates one way of operating a set of three gripping devices from the same crank-shaft.

The three carriages $s^x t^x u^x$ are each connected to three cranks 55, 56, 57 by separate connecting-rods 52, 53, 54; the cranks being so arranged with relation one to another that there will be one of the gripper-carriages always hauling on the cable, thereby overcoming the periods or intervals of no haul on the cable that necessarily take place when two sets of gripping-devices are working.

The cable is carried longitudinally in the center of the frame by a series of sheaves or grooved rollers 9, 10, 13, on stationary shafts or axles, one of which is seen in Fig. 6; the sheaves being rotatable on the axles between fixed collars.

For the more readily placing or removing the cable the axles of these carriers 9, 10, 13 are attached to the stationary frame at one end of their axles by hangers 48 in which they are free to swing in a vertical arc, and the opposite ends of the axles have bearing in a bar 45, which is held in position along the side of the frame by catches 46 carried by a rock-shaft. On throwing off the catches 46 the side-bar 45 is released, and all the cable-carrying sheaves will be dropped at the

same time, thereby allowing the cable to be set in position, or released from the machine without loss of time.

In addition to the cable-carrying sheaves there is provided a carrying-rail 51 extending directly under the cable between one cable carrying sheave and the next, the function of which is to retain the cable in working position within the gripping jaws in those intervals when the jaws have relaxed their grip and are sliding on the cable preparatory to taking a fresh hold. This carrying-bar 51 is supported by stationary shafts 50, which are each pivotally attached at one end to the frame of the machine and detachably supported at the opposite end by a swinging catch. These bars 51 are dropped and replaced in the same manner as the cable-carriers in the operation of placing or of removing the cable. The guide-rollers 14, 15, 16, 17 on upright axles are placed in the frame at opposite ends of the machine to control the deviation laterally of the cable, as in turning curves or in changing the direction of travel of the cable or the machine.

What I claim as my invention, and desire to secure by Letters Patent is:—

1. In a traction apparatus for a cable, the combination of stationary guides, a plurality of reciprocating carriages, cable gripping-devices on each carriage, means for reciprocating the carriages in the guides in opposite directions, and means operating in the reciprocating movements of each carriage to throw on the gripping-devices of each carriage at the beginning of its travel in one direction and to throw off the same at the end of such travel and hold them out of action during the return travel of the carriage.

2. In a traction apparatus for a cable, the combination of stationary guides, a plurality of reciprocating gripper-carriages each provided with cable-gripping devices, means for reciprocating the said carriages in opposite directions, means actuated through the movements of each carriage for throwing on its gripping-devices at the beginning of the travel of the carriage in one direction and for throwing off the gripping-devices at the end of said travel and for holding the same out of action during the return travel of the carriage, and means for reversing the action of the said actuating means, whereby the gripping-devices may be caused to take hold and release the cable in either direction of the travel in the guides.

3. In a traction apparatus for a cable, a plurality of carriages having cable-gripping devices, and means for imparting reciprocating movement to the carriage in opposite directions towards and from a common starting-point, in combination with means for alternately throwing on the gripping-devices of each carriage in one direction of its travel and throwing off the gripping-

devices at the end of said travel and holding the same out of action, said means being actuated through the reciprocating movement of the carriage, and means for throwing
5 said gripper-actuating means into and out of operation at will.

4. In a traction apparatus of the character described, the combination of stationary guides, a reciprocating carriage thereon,
10 gripping devices in said carriage arranged on opposite sides of a channel in the bottom of the carriage adapted to set over and take the cable from above, means for alternately throwing in and throwing off said gripping
15 devices in the reciprocations of the cable, and a stationary cable-supporting bar removably supported under the cable for retaining the same in place in the gripping-devices in the intervals when the gripping-
20 devices are out of operation.

5. In a traction apparatus of the character described, a reciprocating gripper-carriage, stationary guides therefor, gripping devices pivotally mounted in said carriage in sets on
25 opposite sides of a cable channel in the carriage, and means for throwing the gripping devices alternately into and out of action composing a stationary switch-rail, hinged switch-points on said rail, a rock-shaft to
30 each set of gripping devices adapted to actuate the same by its movement, an arm on the rock-shaft arranged to travel upon or beneath the switch-rail according to the position of the switch-points, means for controlling the switch-points, and a spring on
35 the rock-shaft operating in opposition to the said arm.

6. In a cable-grip, stationary guides, a reciprocating carriage having a channel in
40 the bottom to receive the cable, gripping devices arranged in sets on opposite sides of the channel, and means for throwing on and throwing off the gripping-devices in the reciprocations of the carriage, comprising a
45 rock-shaft to which the gripping devices of each set are operatively connected, a spring on each rock-shaft adapted to hold the gripping-devices normally out of action, a stationary switch-rail above the stationary
50 guides, adjustable switch-points thereon, an

arm fixed on the rock-shaft and adapted through the change in its angular position to turn the rock-shaft in a direction opposed to the force of the spring, and means for adjusting the switch-points.

7. In a cable-grip, the combination of
55 stationary guides, a reciprocating gripper-carriage having a channel in the bottom to take the cable, pivotally mounted cable-gripping jaws arranged on opposite sides of
60 the channel, a rock-shaft on each side of the carriage operatively connected to the gripping-jaws in the same set and adapted to throw on or throw off the gripping jaws according to the direction in which the shaft
65 may be turned, a spring operating to throw off and normally hold the gripping jaws out of action, an arm on each rock-shaft, operating through a change in its angular position to turn the rock-shaft in opposition to
70 the force of the spring, and means for changing the position of the rock-shaft.

8. A traction apparatus for a cable, comprising a frame, stationary guides therein,
75 sheaves spaced apart at intervals between the guides for supporting the cable, a plurality of reciprocating carriages, means for imparting movement to said carriages in the guides in contrary direction towards and from a common point in the frame, cable-
80 gripping devices on each carriage, means actuating the gripping-devices including an arm movable in a vertical arc and adapted by a change in its angular position to throw on or throw off the gripping-devices, a sta-
85 tionary switch-rail operating to raise or lower the said arm and thereby act on the gripping devices according to the change of its position assumed by the arm, and adjustable switch-points on said rail adapted
90 to change such position in its contact with the switch-rail.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

OSCAR A. ELLIS.

Witnesses:

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