

H. B. BROCKENBROUGH.  
CABLE GRIPPER.  
APPLICATION FILED FEB. 18, 1911.

1,011,566.

Patented Dec. 12, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

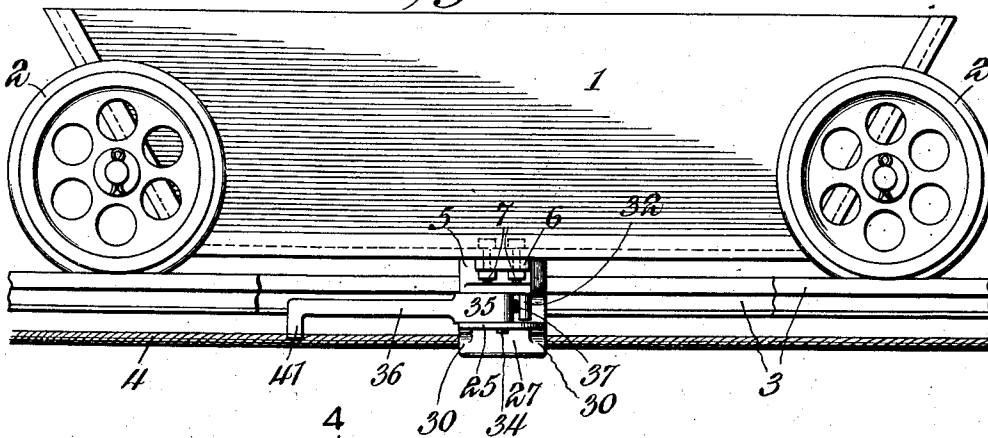


Fig. 2.

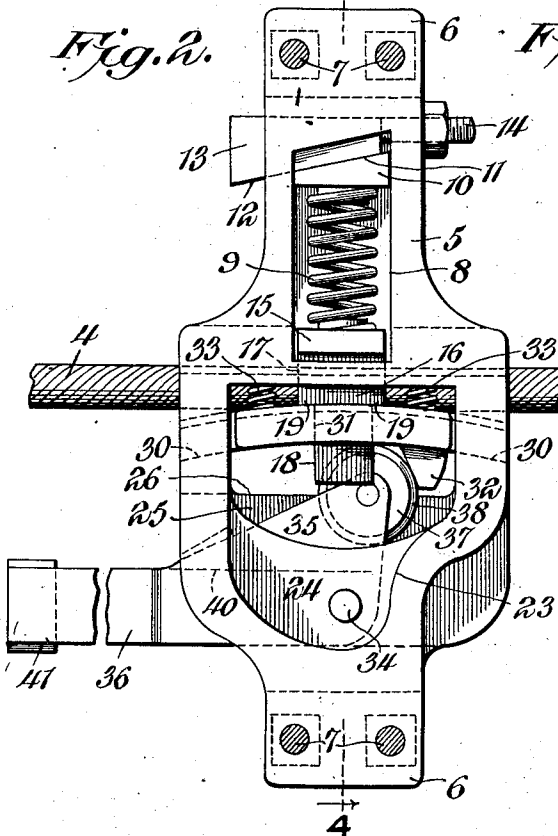
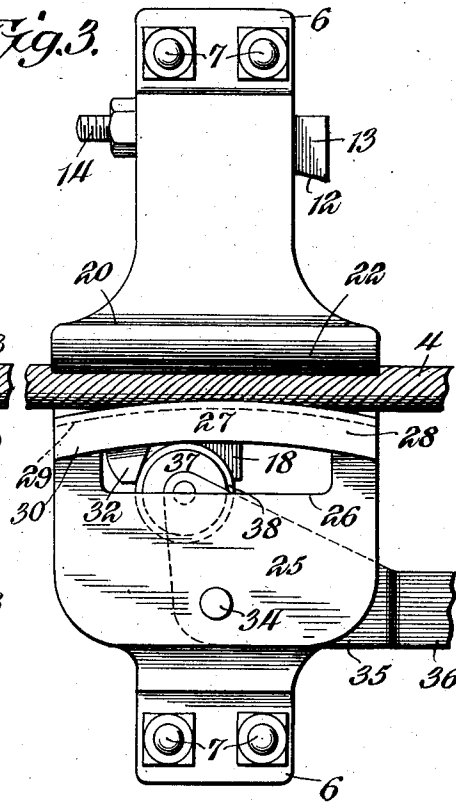


Fig. 3.



WITNESSES

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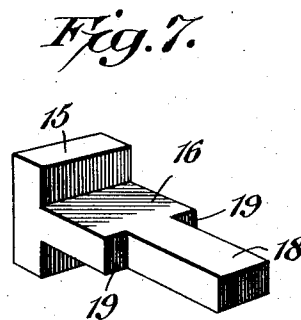
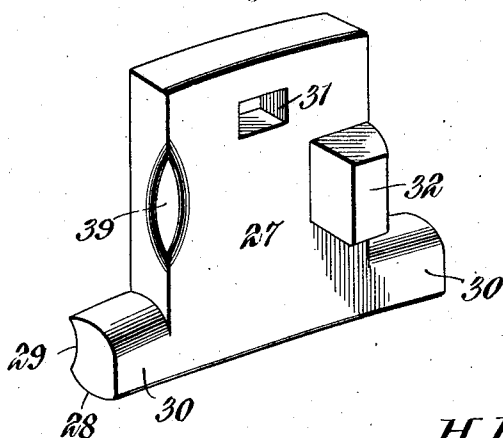
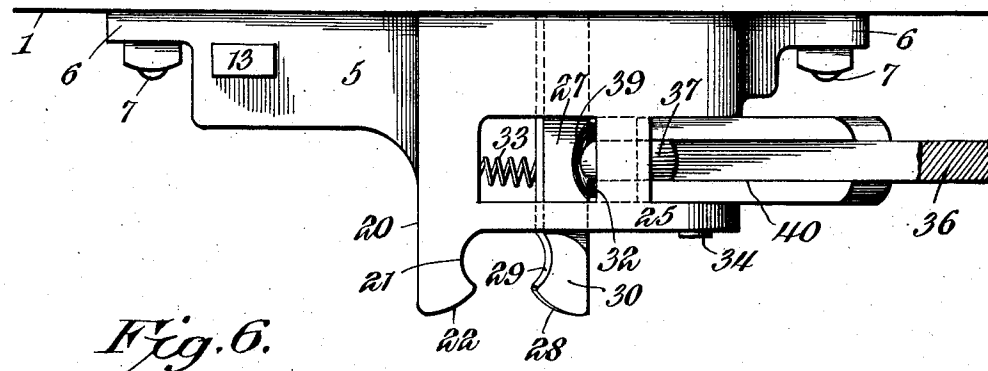
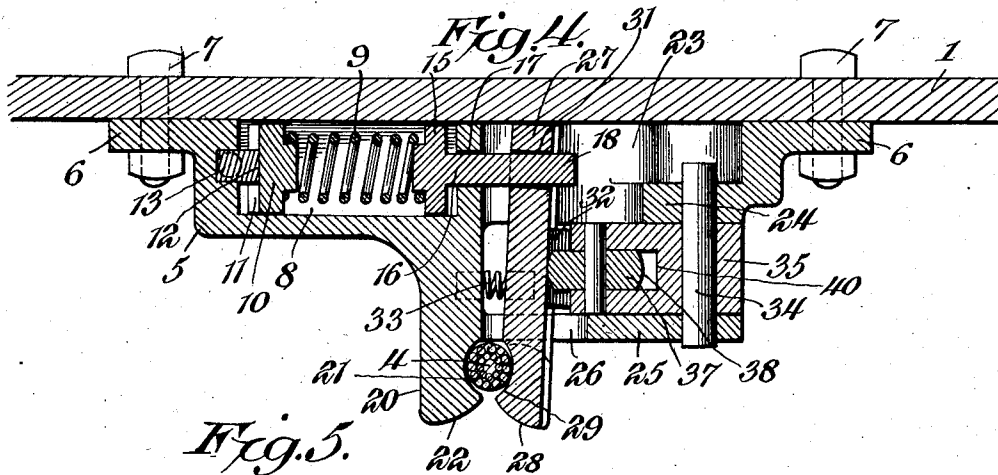
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# UNITED STATES PATENT OFFICE.

HUGH B. BROCKENBROUGH, OF FORT DODGE, IOWA.

## CABLE-GRIPPER.

1,011,566.

Specification of Letters Patent.

Patented Dec. 12, 1911.

Application filed February 18, 1911. Serial No. 609,479.

*To all whom it may concern:*

Be it known that I, HUGH B. BROCKENBROUGH, a citizen of the United States, residing at Fort Dodge, in the county of Webster and State of Iowa, have invented a new and useful Cable-Gripper, of which the following is a specification.

This invention has reference to improvements in cable grippers, and is designed to provide a cable gripper more particularly adapted for use in connection with cars employed in aerial tramways.

In accordance with the present invention there is provided a cable gripping mechanism which will accommodate itself to variations in thicknesses of the power cable, will readily adapt itself to curves around which the car may be directed, and which may be caused to move to either the gripping or throw-off position without any tendency toward lifting the car from the supporting tracks.

The invention will be best understood from a consideration of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification, with the understanding, however, that while the drawing shows a practical form of the invention the latter may assume other practical forms while still retaining the salient features of the invention, and, therefore, the invention is not limited to the particular showing of the drawings.

In the drawings:—Figure 1 is a side elevation of a car with the track and power cable and showing the improved gripper in place, the near track being partially broken away to display the gripper. Fig. 2 is a plan view of the gripper as viewed from above, the securing bolts being shown in cross section. Fig. 3 is a plan view of the gripper as viewed from below, the car being omitted. Fig. 4 is a section on the line 4—4 of Fig. 2, showing the gripper attached to the bottom of the car, the said car bottom being also shown in section. Fig. 5 is an elevation of the gripper as viewed from the left hand side of Fig. 2 with the gripping jaws in the separated or throw-off position and the gripper operating lever partially broken away. Fig. 6 is a perspective view

of the movable jaw as seen from the face against which the lever acts. Fig. 7 is a perspective view of the spring holder designed to be engaged by the movable jaw.

Referring to the drawings, there is shown in Fig. 1 a car 1 mounted upon wheels 2 designed to run upon tracks 3 and adjacent these tracks there is provided a power cable 4. The showing of these several parts is largely indicative, no attempt having been made to show any particular type of car or track or power cable, since the invention is not directed to these particular features and may be utilized in tramways of various types, the showing of the drawings with respect to the several parts mentioned being sufficient for an understanding of the present invention. It may be stated, however, that certain features of the invention are designed with special reference to that type of tramways where the cars are comparatively light and the gripper is designed to prevent the cars from being thrown from the tracks by the operation of the gripper. Furthermore, the tramways are not always carried in a direct line from terminal to terminal, but are sometimes diverted so that curves occur in the track and the present invention makes provision for such curves.

Attached to the bottom of the car there is a casting 5 elongated transversely of the car, and this casting may be of more or less skeleton construction combining lightness and strength. At the ends of the casting are flanges 6 suitably bored for the passage of bolts 7, whereby the casting may be secured to the bottom of the car. At one end of the casting there is provided an elongated chamber 8 designed to house a spring 9. At one end of the spring there is located a spring holder 10 in the form of a block having one edge 11 beveled, and this edge is engaged by the beveled face 12 of a wedge block 13, which latter terminates at one end in a screw stem 14 extending through the corresponding side wall of the spring holder, while the other end of the wedge block is passed through the corresponding wall of the spring chamber, this chamber being usually provided with a slot of suitable size for the purpose. The other end of the spring from the spring holder

10 is engaged by another spring holder 15 having one end lodged within the spring chamber 8 and provided on the side remote from that engaging the spring with an extension 16 passing through an opening 17 in the corresponding end wall of the chamber 8, and this extension 16 is provided with an elongation or stem 18, on each side of which where joining the extension 16 there are shoulders 19. The purpose of this spring holder 15, which is shown in detail in Fig. 7, will be hereinafter set forth.

The body member or casting 5 has formed thereon a gripping jaw 20 projecting at substantially right angles to the length of the casting, and when the gripper is in position on a car and the car is lodged on the tracks, this jaw 20 projects downwardly. Near the outer end of the jaw there is formed on one face an elongated cavity 21 designed to receive the cable 4 in gripping relation to such cable, while the outer edge of the jaw is rounded or curved, as shown at 22, the curvature being so that should the jaw meet the cable by the curved portion 22, the latter will direct the cable toward the cavity 21 constituting the gripping face or seat for the cable.

In that portion of the casting or body member 5 remote from the spring chamber 8 there is formed another chamber 23 provided with a ledge 24 and in spaced relation to the ledge 24 there is another ledge 25 parallel with the ledge 24 and carried by the jaw 20 near the cable gripping cavity 21. The ledge 25 is formed with a passage 26 adjacent the jaw 20 and through this passage 26 projects the active end of another jaw 27 shown in detail in Fig. 6. This jaw 27 is of a width so that the main body of the jaw may project through the passage 26, and this jaw extends from a point adjacent the bottom of the car 1 to a point coincident with the greatest extension of the jaw 20, and at the outer end the jaw 27 is rounded, as indicated at 28, and is, also, provided on one face with a cable receiving cavity 29 matching the cable receiving cavity 21 on the jaw 20, while the rounded edge 28 is so shaped as to direct the cable to the space between the jaws should such rounded surface engage the cable. The gripping end of the jaw 27 has wing extensions 30, so that the active portion of the jaw where gripping the cable is coextensive with the corresponding portion of the jaw 20. However, the active portion of the jaw 27 may be rounded in the direction of the length of the cable engaging cavity, so that the jaw may rock to a slight extent with relation to the jaw 20. This, however, is not mandatory. The jaw 27 is formed with a passage 31 designed to receive the stem 18, and is also provided on the face remote from that engaging the cable with a stop projection 32.

Interposed between the two jaws are springs 33 at a point about midway of the distance between the cable receiving cavities 21 and 29 and the stem 18 of the spring holder 15. The springs 33 tend to move the jaw 27 away from the jaw 20 to cause the ungripping of the cable or the throwing off of the cable from the gripper when such is desired.

Traversing the space between the ledges 24 and 25 is a pin 34 on which is pivoted an angular head 35 on one end of a lever 36, the latter constituting the operating lever for the gripper, and at the angular extension of the head 35 there is mounted a roller 37 with a rounded face indicated at 38, this rounded face being designed to engage the corresponding face of the jaw 27, which face may be termed the rear face, since it is opposite the face in which the cable engaging cavity 29 is formed. In order that the roller 37 may readily engage the jaw 27, the latter may be formed with a slight concavity 39 in the path of the roller 37. Since it is desirable that the roller 37 be as solidly mounted as may be needed, the angular head 35 is recessed as indicated at 40 to form a seat for the roller 37. The lever arm 36 is shown as provided with an angular end 41 which may be employed for the operation of the clutch by suitable mechanism in the path of this angular end as the car 1 travels, or the arm 36 may be utilized for the operation of the clutch by hand.

Let it be assumed that the cable 4 is between the jaws 20 and 27, but that these jaws are not in contact with the cable, so as to grip the same, the lever 36 being moved to a position where the roller 37 is carried sufficiently far in a direction away from the rear face of the jaw 27 to permit the springs 33 to move this jaw out of active position. Under these circumstances the roller 37 will be about coincident with the recess or depression 39 at the side of the jaw 27 remote from the block or abutment 32. If it be desirable to grip the cable, the lever 36 is moved either by hand or by any suitable apparatus in a direction carrying its end 41 toward the cable, the lever moving about the pin 34 as a pivot or this pin may participate in the movement of the lever, and then the latter will move about the longitudinal axis of the pin as a center. The roller 37 engages the rear face of the jaw 27, that is, the face remote from the cable, and the plane intersecting the axis of the roller 37 and the axis of the pin 34 making a somewhat larger angle than ninety degrees with the longitudinal plane of the lever 36, the jaw 27 is forced toward the jaw 20 until the lever 36 is in approximate parallelism with the cable 4 and the roller 37 has passed beyond the center line of the jaw 27 and has come into engagement with

the block or abutment 32 projecting from the corresponding face of the jaw, the said jaw springing back a short distance whereby the block or abutment 32 coacts with the roller 37 to lock the lever against return movement, the angle head 35 of the lever 37 operating after the manner of a toggle to force the jaws together, and then moving past center to operate as a lock against return movement of the lever. During this operation the springs 33 yield as far as may be necessary. The gripping end of the jaw 27 is first brought into engagement with the cable 4, and then as this end of the jaw can have no further movement toward the jaw 20 and as the gripping engagement of the jaw 27 takes place before the roller 37 has reached this point of nearest approach to the jaw 20, the additional movement needed is provided by the yielding of the spring 9, the end of the jaw 27 remote from the gripping end then bearing against the shoulders 19 of the spring holder 15 and forcing the head of the spring holder 15 farther into the chamber 8. The curvature of the rear face of the jaw 27 contributes to this movement and the force necessary to cause the spring holder 15 to move into the chamber 8 is determined by the position of the spring holder block 10 as adjusted by the wedge 13. The cable 4 is, therefore, firmly gripped by a force determined by the spring 9 and the lever 36 is locked by the same force reacting on the roller 37 and forcing the latter against the abutment 32. The cable 4 is, therefore, firmly gripped, even though it should vary in diameter at various parts, for the gripping force exerted is due entirely to the expansive force of the spring 9.

It will be observed that the gripping ends of the jaws 20 and 27 extend an appropriate distance beyond the ledge 25 in the direction of the cable, so that guide rollers necessary to divert the direction of travel of the cable will not in any manner interfere with the gripper.

The gripping jaws open downwardly with reference to the normal position of the car upon the track, and at times the cable may drop below the bottom of the gripping jaws, but when the cable is moved toward the gripper, or the gripper toward the cable, the curved ends 22 and 28 will cause a movement of the cable into position between the concavities or recesses 21 and 29, respectively, but the cable cannot move relatively higher, because of the ledge 25, and when the lever 36 is operated to close the jaw 27 toward the jaw 20, the cable will be firmly and positively gripped. When the lever 36 is moved toward the ungripping or throw-off position the initial movement will cause the jaw 27 to travel a short distance toward the jaw 20, the spring 9 compressing for this purpose and then the reaction of

the spring 9 supplemented by the action of the springs 33 will throw the jaw 27 away from the jaw 20 to release the cable.

The movements of the lever 36 are toward and from the center line of the tracks in a direction which is substantially horizontal if the car be considered as traveling on a level stretch of track, so that all forces exerted in the operation of the gripper are in a direction at right angles to the action of gravity upon the car, and, therefore, these forces will have no tendency to throw the car from the tracks, as would be the case were the gripper actuating mechanisms active toward or from the bottom of the car, it being understood that the cars employed are comparatively light and they are often thrown from the tracks by the exertion of such forces.

What is claimed is:—

1. A cable gripper having a movable jaw with cable gripping means at one end, an elastic support for the jaw at the other end thereof, and jaw operating means engaging the jaw at an intermediate point thereof.

2. In a cable gripper, a movable cable gripping jaw, and positive and elastic actuating means for said jaw engaging the latter at spaced points and coacting to force the jaw into gripping position.

3. In a cable gripper, a movable cable gripping jaw, positive actuating means for said jaw, and elastic actuating means for said jaw coacting with the positive means to force the jaw into gripping position, said positive actuating means engaging the jaw intermediate of the elastic actuating means and the cable gripping portion of said jaw.

4. In a cable gripper, a movable jaw having one end adapted to engage a cable, elastic means engaging the jaw on the cable gripping side, and a toggle actuating means for the jaw engaging the latter on the face remote from that engaging the cable and engaged by the elastic means.

5. In a cable gripper, a movable jaw having one end adapted to engage a cable, elastic means engaging the jaw on the cable gripping side, and a toggle actuating means for the jaw engaging the latter on the face remote from that engaging the cable and engaged by the elastic means, said jaw being provided with a stop member in the path of the toggle actuating means, and coacting with the elastic actuating means to lock the jaw in the gripping position.

6. In a cable gripper, a fixed cable gripping jaw, a movable cable gripping jaw, an actuating device for the movable jaw unconnected therewith, and a spring member engaging the movable jaw on the side of the actuating face remote from the cable gripping portion of said jaw.

7. In a cable gripper, a fixed cable gripping jaw, a movable cable gripping jaw, an

actuating device for the movable jaw, a spring member engaging the movable jaw on the side of the actuating device remote from the cable gripping portion of said jaw, and actuating springs for the movable jaw tending to move said jaw away from cable gripping position.

8. In a cable gripper, a relatively fixed cable gripping jaw, another cable gripping jaw in movable relation to the first named jaw, a toggle actuating lever for the second jaw in position to engage the latter at a distance from its cable gripping portion, and a spring acting on the second jaw on the side of the actuating means remote from the cable gripping portion of said jaw, and means for adjusting the tension of the spring at will.

9. In a cable gripper, a body member having a cable gripping jaw in fixed relation thereto, a jaw carried by the body member and movable with relation to the fixed jaw, a lever having an angle head in operative relation to the movable jaw at one side of its cable gripping portion, a spring carried by the body member in position to act on the movable jaw at a point more remote from the cable gripping portion than said lever, springs interposed between the two jaws, and means for adjusting the tension of the first named spring.

10. In a cable gripper, a fixed cable gripping jaw, a movable cable gripping jaw having a concaved portion on the face remote from that presented to the cable, an elastic means acting on the jaw in spaced relation to the cable gripping portion and on the same side of the jaw as the cable gripping portion, said jaw having a projection or abutment on the concaved face near one edge thereof, and a lever having a short arm provided with a roller, said short arm being at an obtuse angle to the length of the lever and engaging the concaved face of the movable jaw with the projection or abutment in the path of the roller.

11. In a cable gripper, a fixed cable en-

gaging jaw, a movable cable engaging jaw having its cable engaging portion near one of its ends, an elastic jaw engaging device in operative relation to the other end of the jaw, and an angle lever having a roller on its shorter arm in obtuse angle relation to the length of the lever, said lever being positioned to engage the face of the jaw remote from that engaged by the elastic device at a point intermediate of said elastic device, and the cable engaging portion, and said jaw being provided with an abutment in the path of the roller on the lever at the completion of its active movement.

12. In a cable gripper, a body member having a fixed jaw provided with a cable gripping portion, and a ledge projecting from said cable gripping portion, a movable jaw in traversing relation to the ledge and having a cable gripping end in operative relation to the cable gripping end of the fixed jaw, said movable jaw being provided at an intermediate point with an abutment on the face remote from the cable gripping portion, springs interposed between the two jaws, a spring carried by the body member and provided with a spring holder in engaging relation to the end of the movable jaw remote from its cable gripping portion, means for adjusting the tension of the spring at will, and an angle lever having a shorter arm in obtuse angle relation to the longer arm of the lever and carrying a roller at its outer end, said lever being positioned to engage with its roller the face of the movable jaw remote from that acted on by the second named spring at a point to bring the roller into engagement with the abutment on the completion of the active movement of the lever.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HUGH B. BROCKENBROUGH.

Witnesses:

J. M. NORTON,

J. H. HELLER.