(No Model.) 4 Sheets—Sheet 1.

J. H. PENDLETON.

GRIP FOR CABLE RAILWAY CARS.

No. 387,912. Patented Aug. 14, 1888.

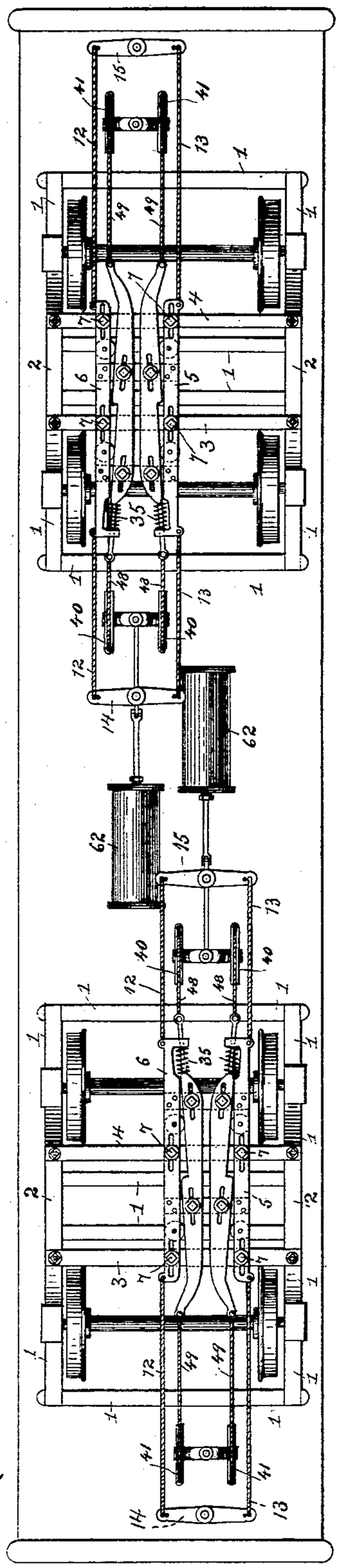

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

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Fig. 2.

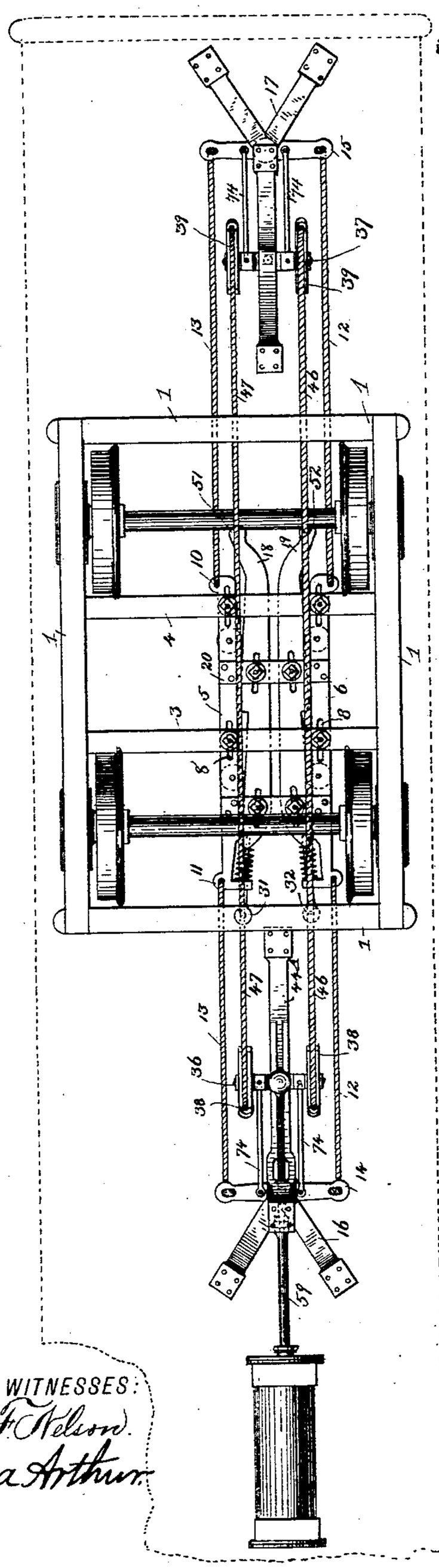
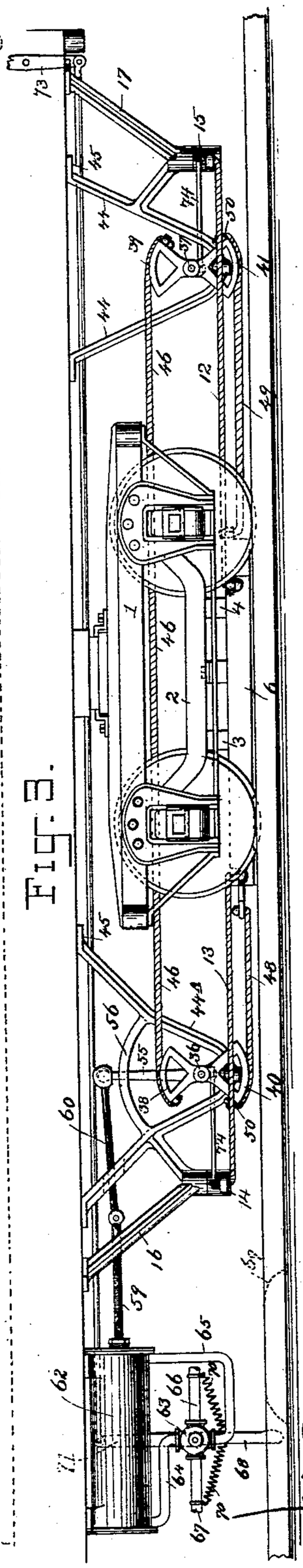


Fig. 3.



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GRIP FOR CABLE RAILWAY CARS.

No. 387,912. Patented Aug. 14, 1888.

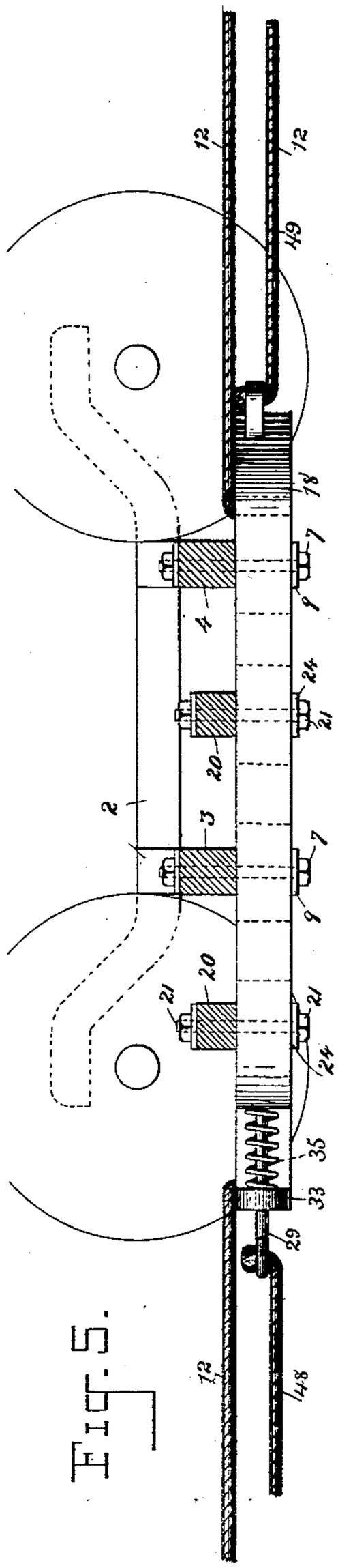

Fig. 5.

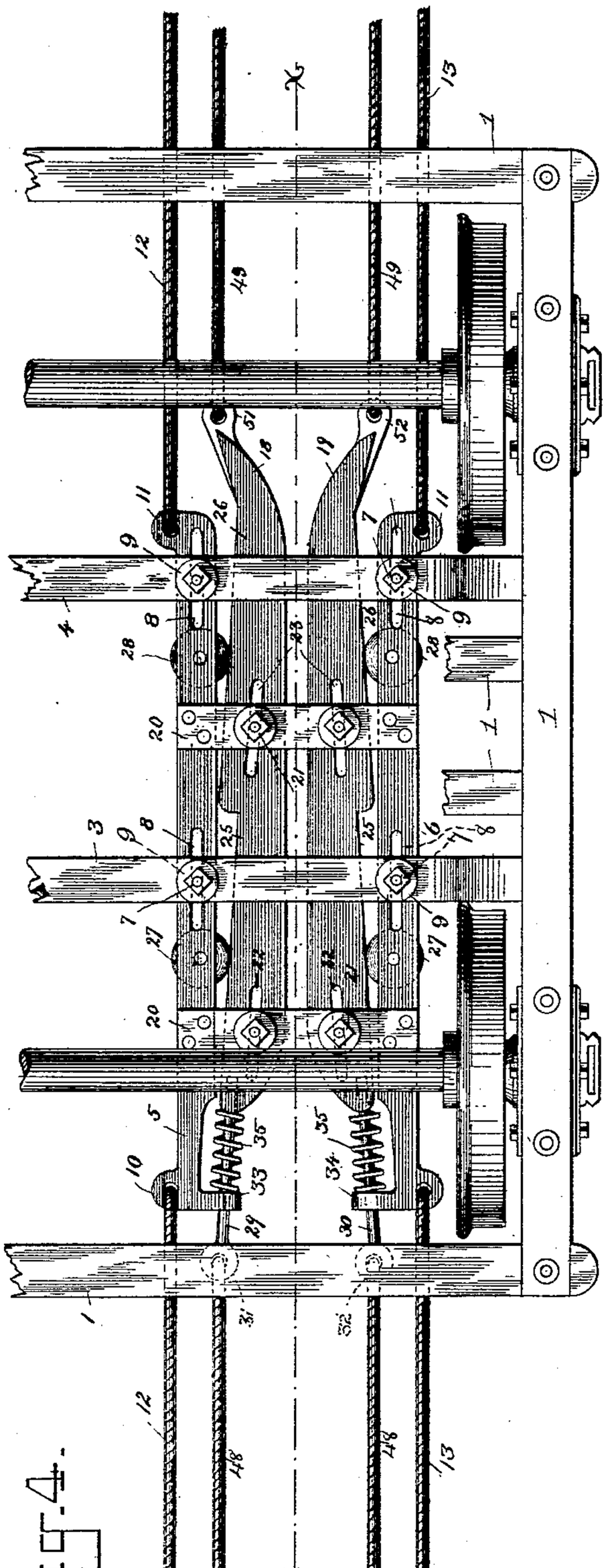

Fig. 4.

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GRIP FOR CABLE RAILWAY CARS.

No. 387,912. Patented Aug. 14, 1888.

Fig. 6.

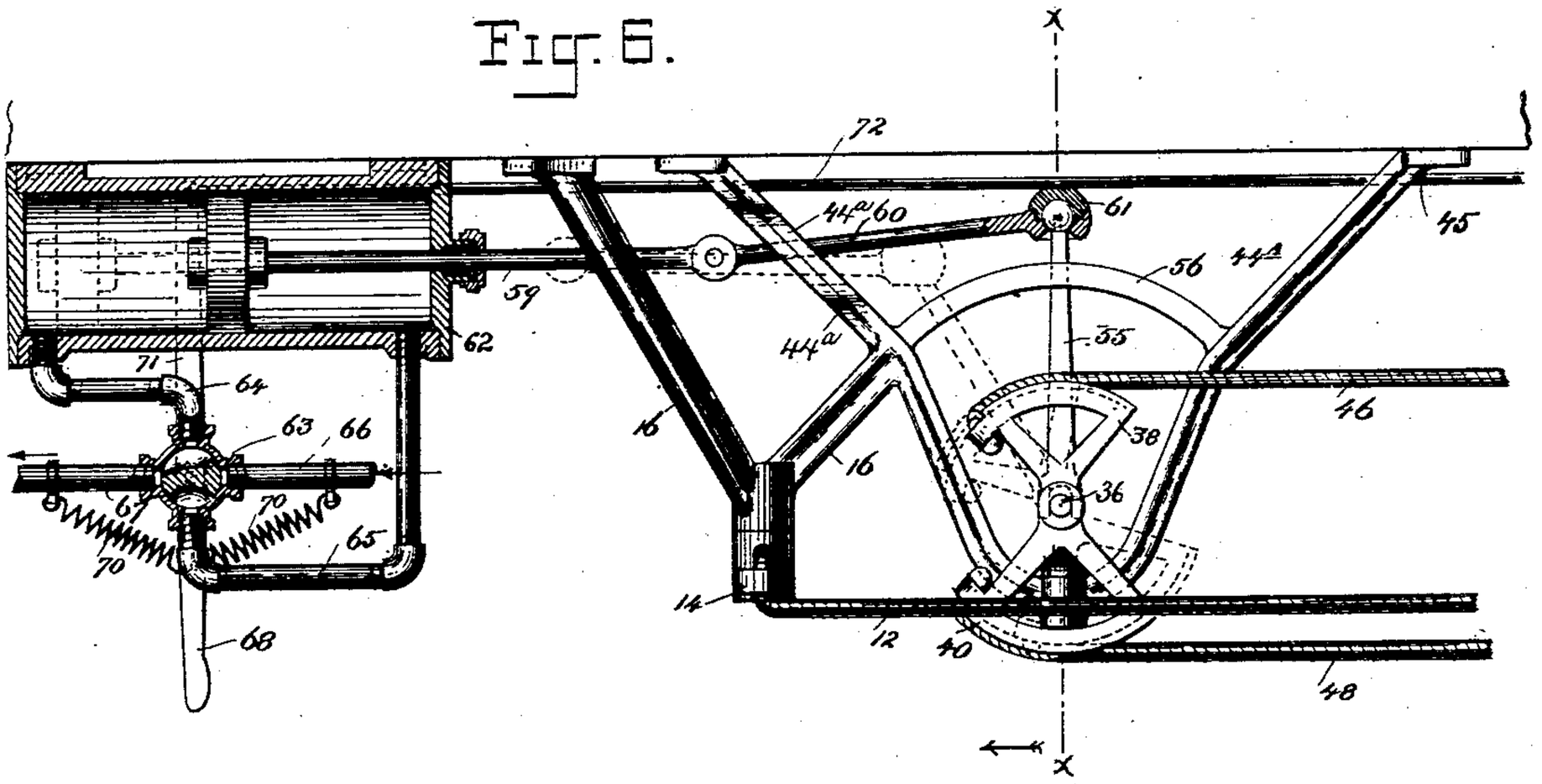


Fig. 7.

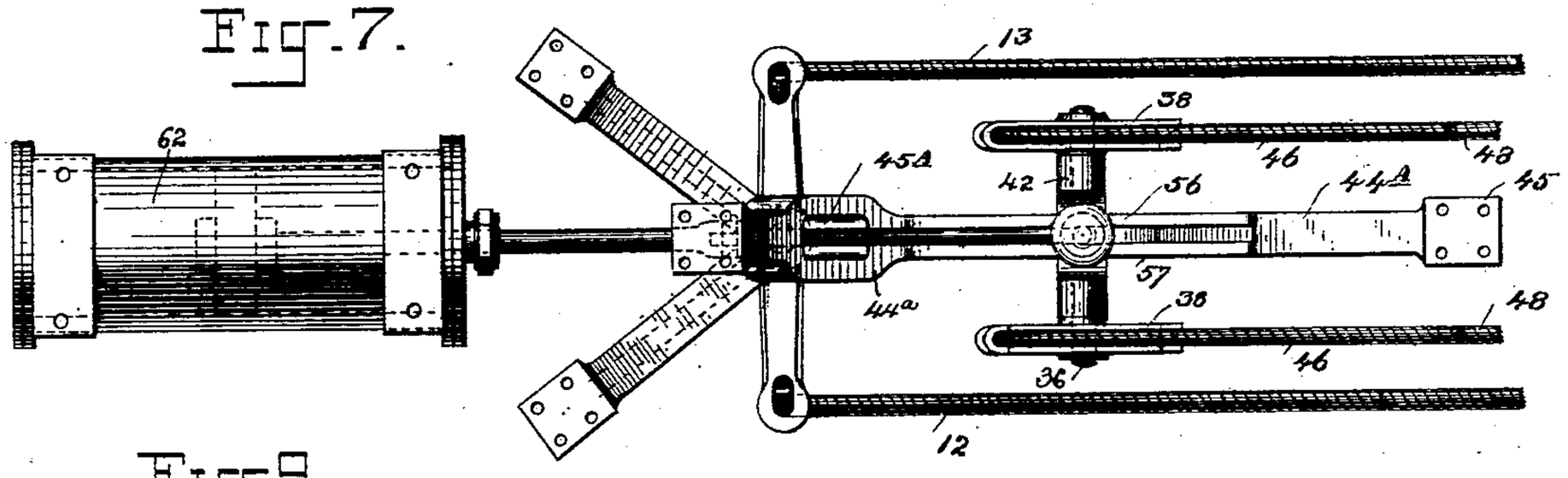


Fig. 9.

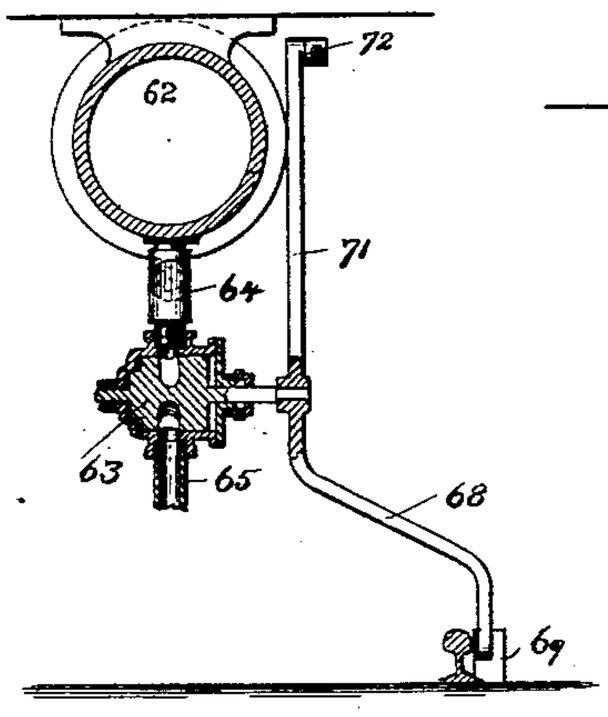
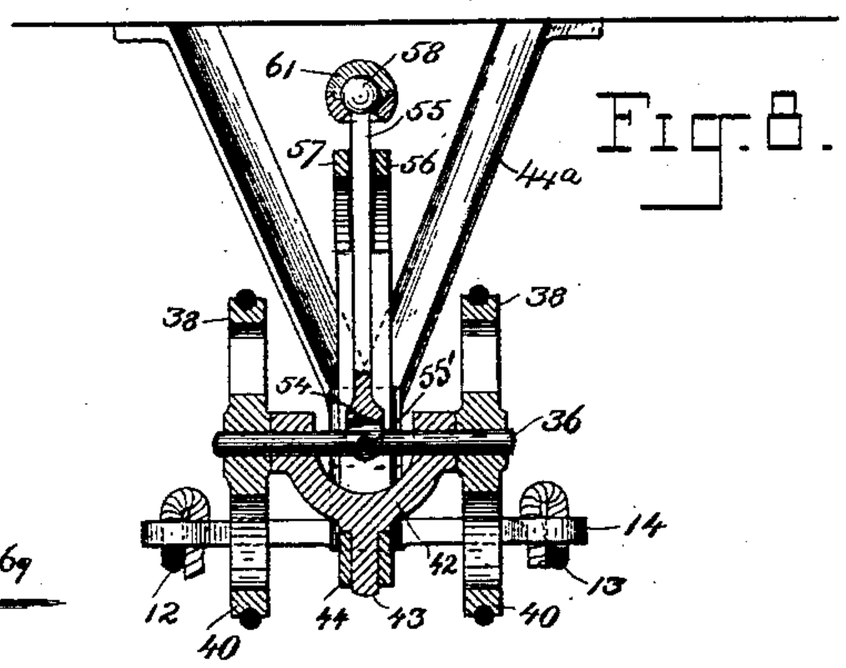


Fig. 8.



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GRIP FOR CABLE-RAILWAY CARS.

SPECIFICATION forming part of Letters Patent No. 387,912, dated August 14, 1888.

Application filed December 19, 1887. Serial No. 258,349. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. PENDLETON, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Grips for Cable Railways, of which the following is a full, clear, and exact specification.

My invention has for its object a grip which is adapted for automatically grasping the auxiliary traveling cable and the like, placed at stations and curves throughout the line of elevated or other roads for the purpose of starting the cars, and also for conveying the same around curves; and it is also adapted for grasping an endless cable placed at stations along the line of road while the train is in motion, for overcoming the momentum of the train, and at the same time operating suitable mechanism for generating power sufficient to start the train when stopped. Such devices are shown and described in my applications for United States Letters Patent, Serial Nos. 258,345, 258,350, and 258,352, (the last-named being an electric device,) filed of even date with this.

With these ends in view my invention consists in adjustably attaching to the truck or other convenient place on the car a pair of grip shoes or runners, which are guyed to the car-body, and are adapted to permit the truck from which they are swung to "go and come" in the act of rounding curves, and they are provided with cam-surfaces bearing upon wheels or rollers mounted in stationary blocks, the said shoes also having a spring or cushion for holding their gripping-surfaces together, so that when the shoes come in contact with both sides of the cable the latter will have a tendency to draw the shoes in its own direction, and thus clamp them tightly to it by reason of the cam-surfaces wedging between the wheels or rollers.

My invention consists, further, of the novel arrangement of parts for automatically throwing these shoes out of engagement and for throwing them into engagement by air apparatus; and it also consists in certain minor features of novelty, all of which will now be described with reference to the accompanying drawings, which form a part of this application, and in which—

Figure 1 is an inverted plan of a car-body having my improvements applied thereto, some of the minor details being omitted for the sake of clearness. Fig. 2 is a plan of one truck having the grip appended to its under side, and showing the operating mechanism, the car-body being represented by dotted lines. Fig. 3 is a side elevation of the same. Fig. 4 is an enlarged detail view of a portion of a truck, showing the grip and the manner of attaching it. Fig. 5 is a vertical longitudinal section taken on the line X X, Fig. 4. Fig. 6 is a side elevation of the operating mechanism, partly in section. Fig. 7 is a plan of the same. Fig. 8 is a transverse section of the same, taken on the line X X, Fig. 6, and looking in the direction of the arrow. Fig. 9 is a side elevation of the valve and operating-levers, partly in section.

On elevated or other roads where two or more cars are run coupled together in a train it is only necessary to employ my grip on the car at each end of the train, so that when the cars are shifted at the terminus of the route the grip which was used on the down trip may be abandoned and the grip at the other end of the train may be operated during the up trip, the cable with which these grips engage generally being arranged to the same side of the center on both tracks and the grips of course being arranged on the opposite sides of the center of the trucks; but in cases where but one car is employed it is preferable to have a grip at each end of the car on opposite sides of the trucks and adapted to operate in opposite directions.

1 represents a truck-frame, and 2 2 represent the equalizers on each side thereof, on the under side of which are bolted cross-bars 3 4. To these cross-bars and to one side of the center of the truck are suspended blocks 5 6 by means of bolts 7, which pass through these cross-bars and through longitudinal slots 8 in the blocks, and carry washers 9 at their lower extremities, upon which the blocks rest. At each end of these blocks are links 10 11, in which guys 12 13 are secured and fastened to the ends of the pivoted levers 14 15, suspended by brackets 16 17 from the car-body, whereby the blocks are securely anchored to the latter and at the same time they are permitted to reciprocate upon the truck.

18 19 are grip-shoes, which are located between the blocks 5 6 and are suspended from cross-bars 20, secured to the blocks 5 6 by means of bolts 21, which pass through the cross-bars and through slots 22 23 in the grip-shoes and carry washers 24, upon which the shoes rest and slide. These shoes are provided on their surfaces adjacent to the blocks 5 6 with cams 25 26, which contact with idle-rollers 27 28, journaled in the blocks 5 6, and slots 22 23 being formed parallel with the surfaces of these cams in each shoe, so that when the shoes are pushed lengthwise, so as to bring the cam-surfaces in contact with the rollers 27 28, they will be permitted a longitudinal as well as a transverse movement.

The shoes 18 19 are provided at one end with stems 29 30, which are securely fastened therein and are provided at their outer extremities with links 31 32, and have coiled thereon between the ends of the shoes and arms 33 34 on the blocks 5 6 spiral springs 35, which bear continually against the shoes and tend to force their cam-surfaces in engagement with the rollers, and consequently together. It may be here stated, however, that the shoes are not adjustable vertically like the jaws of many grips for the purpose of causing them to engage the cable, but are fixed on a level with the auxiliary cable belt, which is fully described in my aforesaid applications, and run onto the end, as it were, of this auxiliary cable belt, where it passes over its pulley and the shoes seize the cable, supposing it to be at rest by virtue of the frictional contact between the cable and the traveling grip-shoes, which causes the latter to slide backward, and in doing so wedge themselves between the fixed rollers and the cable, and this motion, being imparted to both shoes simultaneously, causing them to move toward each other, will of course cause them to clamp the auxiliary cable, and it will also be seen that the greater the inertia between the traveling grip-shoes and the stationary cable the firmer will be the grasp.

In order that the grip may be capable of automatically running onto the end of the cable longitudinally, as above described, and while it is held in a closed position by the springs 35, the ends of the shoes 18 19 are rounded or runner shape, so that when the cable strikes between these ends it will be guided to the space between the shoes, and thereby gradually force them apart and slide therein until the friction produced causes the shoes to lag behind with the cable and in so doing pinch the latter, as above described.

36 37 are rock-shafts which have projecting upwardly therefrom and at each end sectors 38 39 and downwardly therefrom similar sectors, 40 41. These rock-shafts are journaled in Y-shaped pieces 42, which have pivots 43 journaled in brackets 44 44^A, which are bolted at 45 to the car-body and extend downwardly, so as to bring said shafts on a level with the grip, whereby the shaft 36 is practically pivoted at its mid-length and at the same time its rocking is permitted. The bracket 44^A is provided with an opening, 45^A, through which a pitman operates. The surfaces of these sectors are grooved for the reception of cables, the sectors 38 39 being connected together by cables 46 47, which extend under the truck and above the grip, while the sectors 40 41 on the bottom of the shafts have cables 48 49 secured at 50 thereto and to the links 31 32 and 51 52 at the ends of the grip-shoes, respectively. By thus connecting the sectors it will be seen that when one of the shafts 36 37 is rocked the other shaft will necessarily rock in unison with it.

To the center of the shaft 36, I pivot a lever, 55, by means of a pin, 55′, which extends transversely through the shaft and through a bifurcation, 54, at the end of the lever, which straddles the shaft. This lever extends upwardly between two guide-rails, 56 57, which are supported at each end by the arms of the bracket 44 for the purpose of limiting the oscillations of the lever to a vertical plane. The upper extremity of this lever is provided with a ball, 58, to which the piston-rod 59 is connected by means of a pitman, 60, having a socket, 61, thereon. This arrangement is essential for the reason that when the truck strikes the curve in the track the grip changes its position relatively to the car-body, owing to its being located upon the truck, and, as it is connected both by the rock-shafts 36 37 and the pivoted levers 14 15 to the car-body, it will of course be seen that these rock-shafts and levers will have to move in unison with the grip; and should the rock-shaft 36 be otherwise connected than by a gimbal-and-socket joint to the piston in the cylinder 62 the lever 55 would oscillate sidewise when it should be beyond the vertical position and the truck should be on the curve, and thus cause damage to the parts, whereas the gimbal-joint which is formed by the bifurcated lever and the pivoted rock-shaft will rock the shaft while the latter is at any angle to the car-body, and at the same time the lever will remain in a vertical plane.

By admitting the pressure to one side of the cylinder it will be seen that the lever 55 will be pushed forward between the guide-rails 56 57 and rock the shaft 36, whose lower sectors, 40, will draw upon the cables 48, compress the springs 35, and draw the narrow portions of the cams 25 26 opposite to the wheels 27 28 and thus release the grip from the cable, and when pressure is admitted to the opposite side of the cylinder the lever 55 will be oscillated in the opposite direction and force the shoes on by pulling upon the cables 49, and thus drawing the wide portions of the cams into contact with the wheels 27 28.

By the mechanism presently to be described it will be seen that the conductor has entire control over the grip-shoes and is enabled at any time to throw them on or off; but in case he should not be at his post or in case his part

of the mechanism should fail to act, the shoes would not be released from the traveling chain, belt, or other device employed as a "starter" when leaving the station, and consequently create damage to the truck. As a safeguard against this, I provide valve 63, which is located at the juncture of the two port-pipes 64 65, the inlet-pipe 66, and the exhaust-pipe 67. This valve is provided with a lever, 68, capable of operating the valve when oscillated, which projects downward and is curved outward, so as to engage with a block or cam, 69, on the outside of the track-rail. The valve-lever is held normally vertical by spiral springs 70, connected to the inlet and exhaust pipe, and in which normal position communication with the inlet is entirely shut off. This block or cam 69 is located near the terminus of the auxiliary cable or starter shown and described in my aforesaid applications, so that when the car reaches this point the lever 68 will strike the said block and open communication between the inlet-pipe and the exhaust-pipe 67, shoving the piston outwardly and operating the lever 55, which will draw upon the cables 48 and release the shoes from the said auxiliary cable or starter. As soon as the lever 68 has passed over the block 69, the spiral springs will return the same to its normal vertical position and open communication between the port-pipe 64 and the exhaust-pipe 67, whereupon the compressed air will escape and the springs 35 will force the grip-shoes together or toward each other again, and consequently force the piston toward the port 64.

This grip is adapted to grasp the cables automatically on coming into the station, provided that the cable is in motion; but in case the cable is at rest and it be desired to grasp the cable for the purpose of setting it in motion the grip of course will not act automatically, but, to the contrary, will have a tendency to loosen. Therefore, to place the conductor in power to force the grip on by air, I provide an upwardly-extending arm, 71, on the lever 68, which is pivoted to a push-rod, 72, which extends under the car and is connected to an operating-lever, 73, on the platform or other convenient place on the car. Thus it will be seen that the conductor is at liberty to force the grip on and off at will; but as soon as he abandons the lever the springs 70 will automatically return the lever 68 to a vertical position, and consequently close the valve 63 with the inlet 66.

The pivoted levers 14 15 and the pivoted Y-shaped pieces are coupled by means of links 74, so that these parts will remain parallel and prevent the grip-shoes and blocks 5 6 from changing their positions relatively to each other.

It is essential that there should be a little lost motion in the cables 48 49, and also in the guys 12 13, so that when the truck rounds the curve and the ends of the grip-shoes describe an arc in opposite directions the lost motion in the cables and guys may be taken up to compensate for the increase in the distance between the rock-shafts through the length of the grip-shoes.

The operation of this device may be briefly stated as follows: When a car approaches a curve in the line where an auxiliary traveling cable, such as described in my aforesaid applications, is continually in motion or the same set in motion by an operator, the main traction-cable (which I have not shown) is dropped from the main cable-grip, (which is also not shown,) and the grip-shoes 18 19 seize the auxiliary chain or cable where it runs over the large pulley, (shown and described in my aforesaid applications,) and are forced backward, compressing the springs 35, and slide along the cable until the speed of the car becomes less than that of the traveling cable, whereupon the impinging faces of the shoes will be forced firmly into contact with the cable by the springs, and the friction produced by the traveling cable upon the faces of the shoes will cause the latter to travel along with it, allowing the springs to relax and bringing the wide portions of the cam-surfaces in contact with the wheels 27 28, and produce a pressure against the cable which will be in proportion to the strain between the inertia of the cable and that of the car. When the lever 68 reaches the cam 69 on the track, the valve will be opened and the grip-shoes released from the cable, as before described. Now, when the train is running into a station and the endless cable is at rest and it is desired to grasp the same for stopping the car and for operating mechanism for generating power for starting the car when stopped, the bevel ends of the grip-shoes will receive the cable and allow it to pass through the grip-jaws in the direction opposite to that in which the car is moving, and will not be grasped, but will be permitted to glide through the jaws until the operator sees fit to oscillate the lever 73 on the platform and open the valve 63 through the medium of the rod 72 and lever 71 and admit pressure through the port-pipe 65, whereby the lever 55 will be rocked in the position shown in dotted lines in Fig. 6, and the cables 46, 47, 48, and 49 will draw upon the grip-shoes and wedge their cam-surfaces between the rollers 27 28, which will firmly secure the car to the cable and cause the latter to travel over the pulley-wheels in the bed of the track and operate any suitable mechanism for generating power. The operation of this mechanism will of course overcome the momentum of the train, and when it is desired to start the train again the chain this time will be set in motion, and of course the grip will automatically engage with it.

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

1. A pair of grip jaws or shoes anchored to the car-body and adjustably secured to the car-truck, substantially as set forth.

2. A grip consisting of one or more sliding

shoes or jaws having their adjacent end surfaces beveled or rounded to receive the cable and cam-surfaces and stationary rollers bearing upon said cams, substantially as set forth.

3. The combination, with fixed rollers, of grip-jaws located between said rollers and having their adjacent faces beveled or rounded at the ends and inclined or cam surfaces, substantially as and for the purposes set forth.

4. The combination, with the truck and the car-body, of longitudinally-adjustable blocks 5 6, secured to the truck and car-body, the rollers 27 28, journaled in said blocks, and the grip-shoes located between said rollers and having their adjacent end faces beveled or rounded, and inclined or cam surfaces adapted to contact with said rollers, substantially as set forth.

5. The combination, with the blocks 5 6, of the rollers 27 28, journaled therein, the grip-shoes having inclined or cam surfaces 25 26 and slots 22 23, extending parallel with said cam-surfaces, and suspension-bolts in said slots, substantially as and for the purposes set forth.

6. The combination, with the blocks 5 6, of the rollers journaled therein, cross-bars on said blocks, and the grip-shoes having inclined or cam surfaces 25 26, adjustably secured to said cross-bars, substantially as set forth.

7. The combination, with the rollers 27 28, having fixed journal-bearings, of the grip-shoes located between said rollers and having slots 22 23 and cam-surfaces 25 26 in juxtaposition to said rollers, supports extending through said slots, and springs for forcing said cams in engagement with the rollers, substantially as and for the purposes set forth.

8. The combination, with the shoes having cam-surfaces 25 26 and slots extending parallel with said surfaces, of the stems 29 30, secured to said shoes, the arms 33 34, and springs between the shoes and said arms, substantially as and for the purposes set forth.

9. The combination, with the car-body and with the cross-bars 3 4, secured to the truck-frame, of the blocks 5 6, having longitudinal slots, supports secured to the bars 3 4 and extending through the said slots, and cables secured to said blocks and to the car-body, substantially as and for the purposes set forth.

10. The combination, with the rollers 27 28, of the shoes 18 19, located between said rollers and having cams 25 26 and slots parallel with the faces of said cams, supports for said shoes extending through said slots, and cables or rods connected to both ends of said shoes for forcing the cams into and out of engagement with the rollers, substantially as and for the purposes set forth.

11. The combination, with the truck having the cross-bars 3 4, of the blocks 5 6, having longitudinal slots, bolts extending through said cross-bars and slots and having washers upon which the blocks rest, pivoted levers secured to the car-body, and cables secured to said levers and to the ends of the blocks 5 6, substantially as and for the purposes set forth.

12. The combination, with the car-body and the truck, of the blocks 5 6, adjustably secured to the truck, brackets secured to the car-body, levers pivoted to said brackets, and cables secured to said blocks and to the pivoted levers, substantially as set forth.

13. The combination, with the truck, of the shoes 18 19, adjustably secured thereto, cam-surfaces on said shoes, fixed bearings for said cams and between which said shoes are located, springs for forcing said cams in contact with their bearings, a pivoted rock-shaft, crank arms or levers on said shaft, cables connecting said levers with the shoes 18 19, and suitable means for rocking said shaft, substantially as set forth.

14. The combination, with the truck, of the shoes 18 19, adjustably secured thereto, cam-faces on said shoes, fixed bearings for said cams and between which said shoes are located, springs for forcing said cams in contact with their bearings, pivoted rock-shafts, sectors extending upwardly and downwardly from said shafts, cables connecting the sectors of one side of the shafts with each other, and cables connecting the sectors of the opposite side with the shoes 18 19, substantially as set forth.

15. The combination, with a rock-shaft, of a pivoted journal bearing in which said shaft is mounted, and a lever, a pivot extending transversely through said shaft and pivoting said lever thereto, substantially as set forth.

16. The combination of the pivoted piece 42, a rock-shaft mounted therein, a lever having a bifurcated end straddling said shaft, and a pivot extending through said bifurcated end and shaft, substantially as and for the purposes set forth.

17. The combination, with the bracket 44^{A}, of the Y-shaped piece 42, pivoted thereto, a rock-shaft journaled in said piece, a lever having a bifurcated end straddling said shaft, a pin extending through said bifurcation and shaft, and a guide for restricting the oscillations of said lever to a vertical plane, substantially as set forth.

18. The combination, with the bracket 44^{A}, of the piece 42, pivoted thereto, a rock-shaft journaled in said piece 42, a lever pivoted to the center of said shaft, and guide-rails at both sides of said lever for limiting its oscillations.

19. The combination, with the cylinder having a piston-rod and with the grip-shoes, of a rock-shaft connected to said grip-shoes and pivoted at its mid-length and a lever attached to said piston-rod and pivoted to said rock-shaft, substantially as set forth.

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