(No Model.) 4 Sheets—Sheet 1.

G. RISCHMULLER.

CABLE RAILWAY GRIP.

No. 371,364. Patented Oct. 11, 1887.

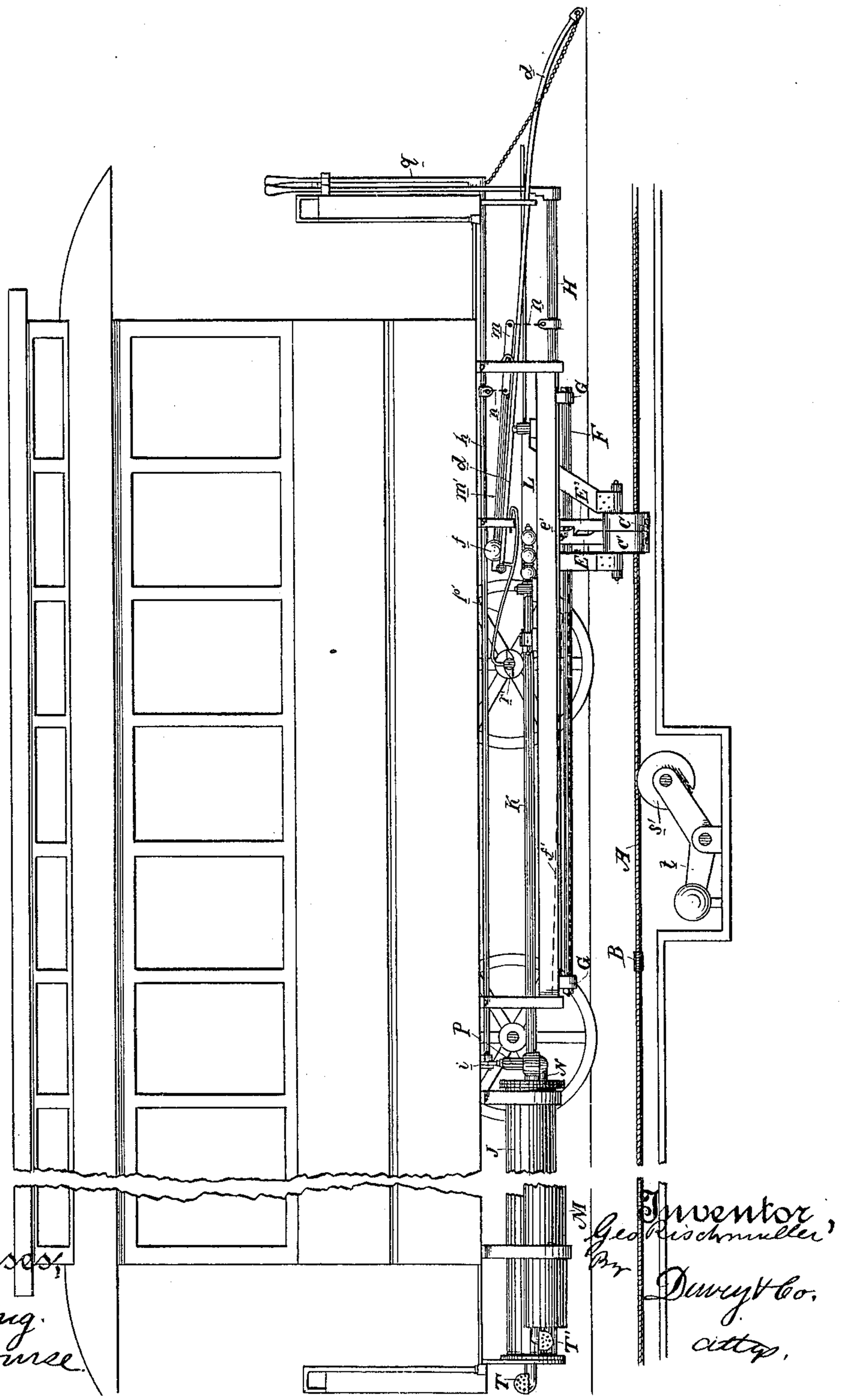

Fig. 1.

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G. RISCHMULLER.

CABLE RAILWAY GRIP.

No. 371,364. Patented Oct. 11, 1887.

Fig. 2.

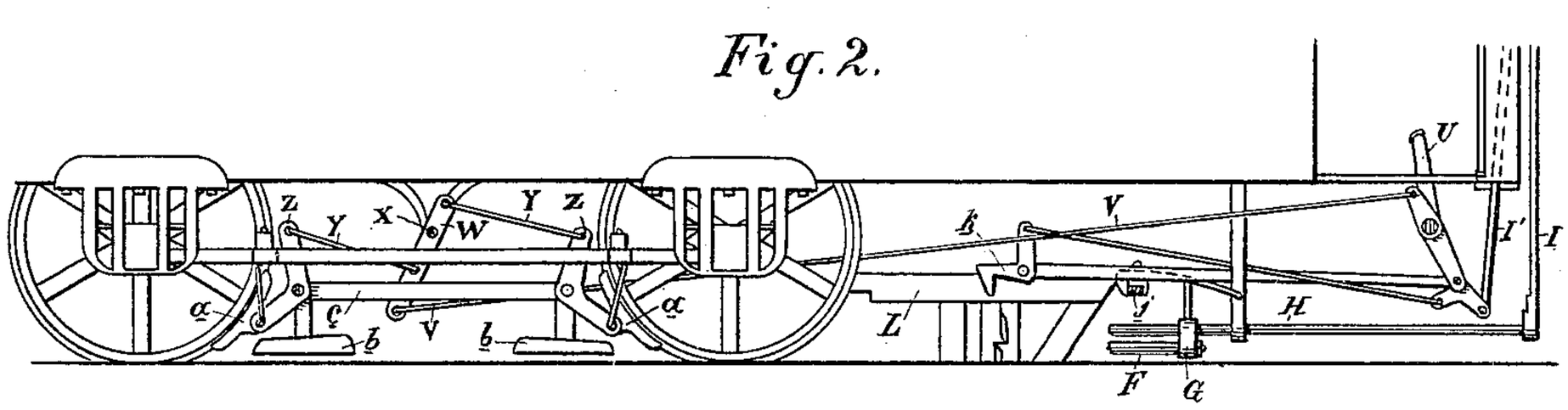


Fig. 3.

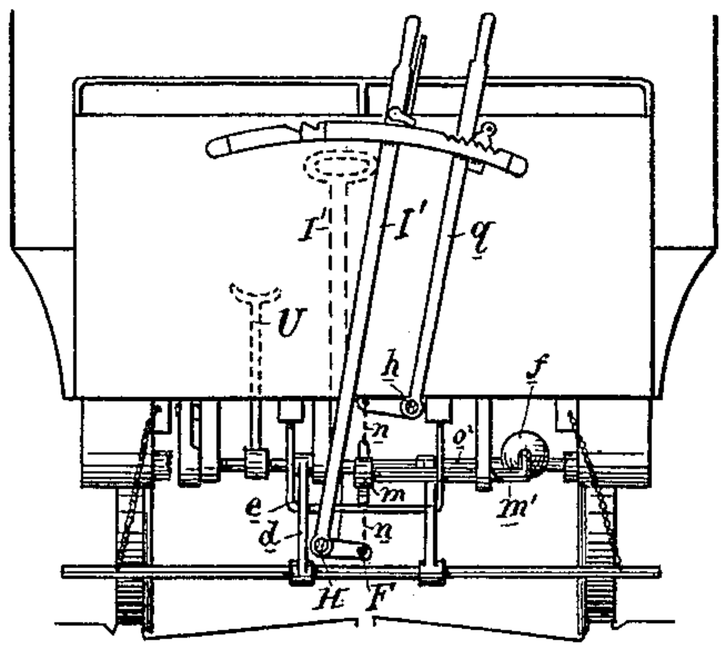


Fig. 4.

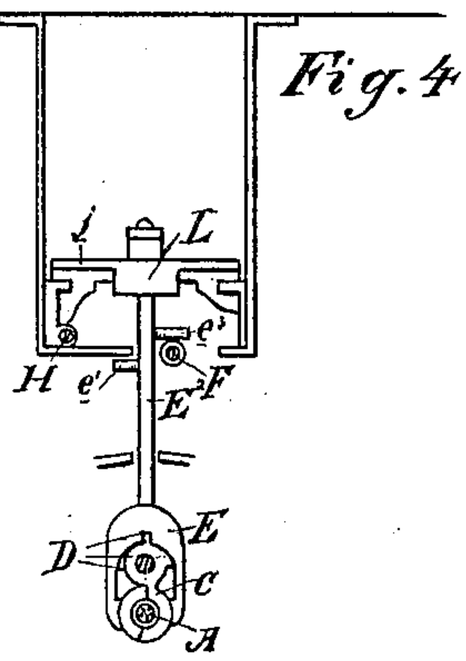


Fig. 5.

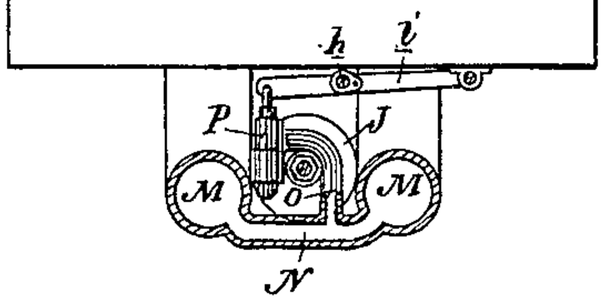


Fig. 6.

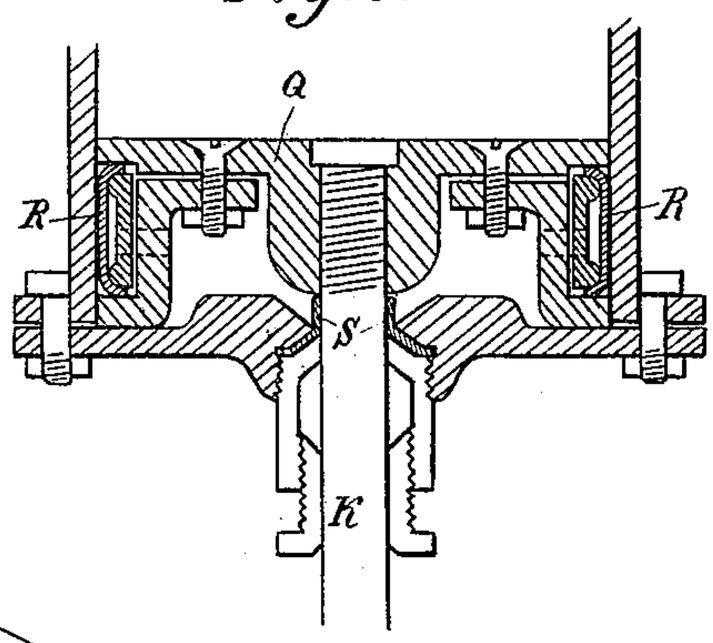
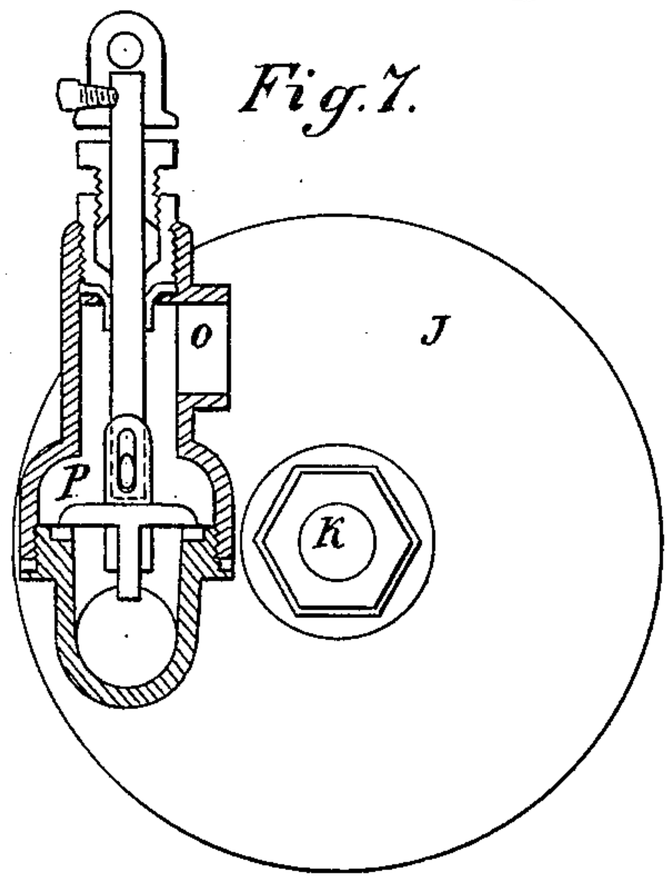


Fig. 7.



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(No Model.) 4 Sheets—Sheet 3.

G. RISCHMULLER.

CABLE RAILWAY GRIP.

No. 371,364. Patented Oct. 11, 1887.

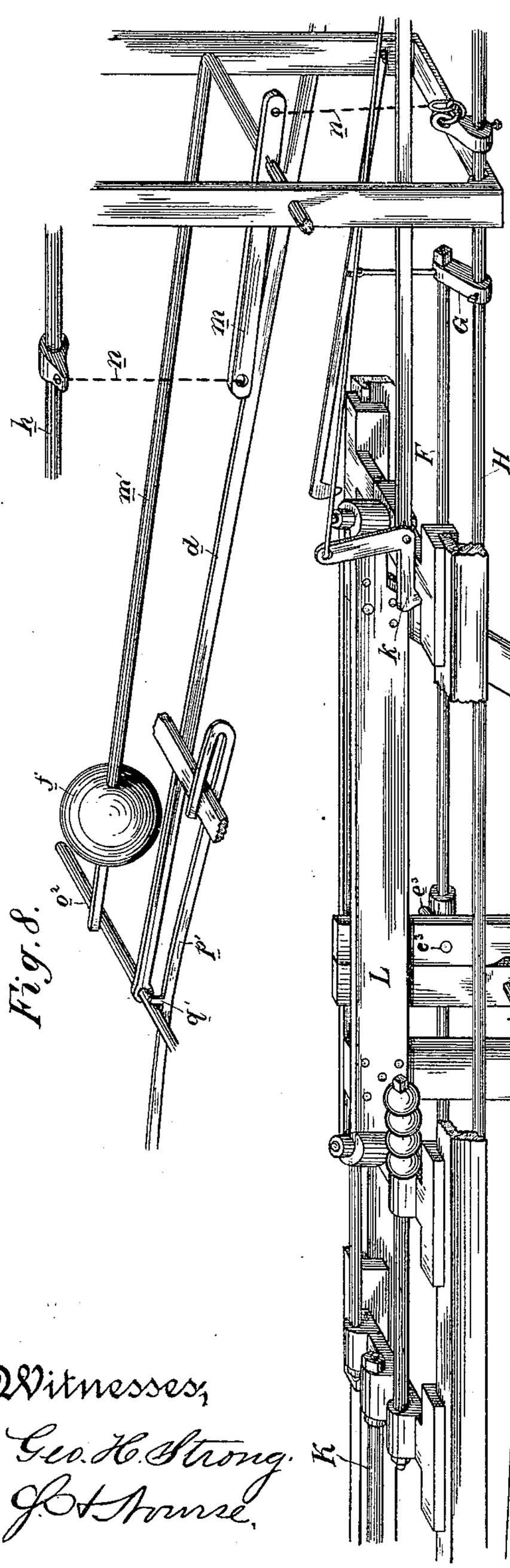
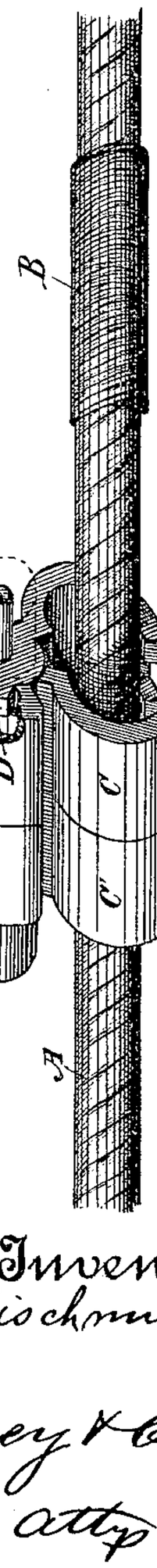


Fig. 8.

Fig. 9.



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CABLE RAILWAY GRIP.

No. 371,364. Patented Oct. 11, 1887.

Fig. 10.

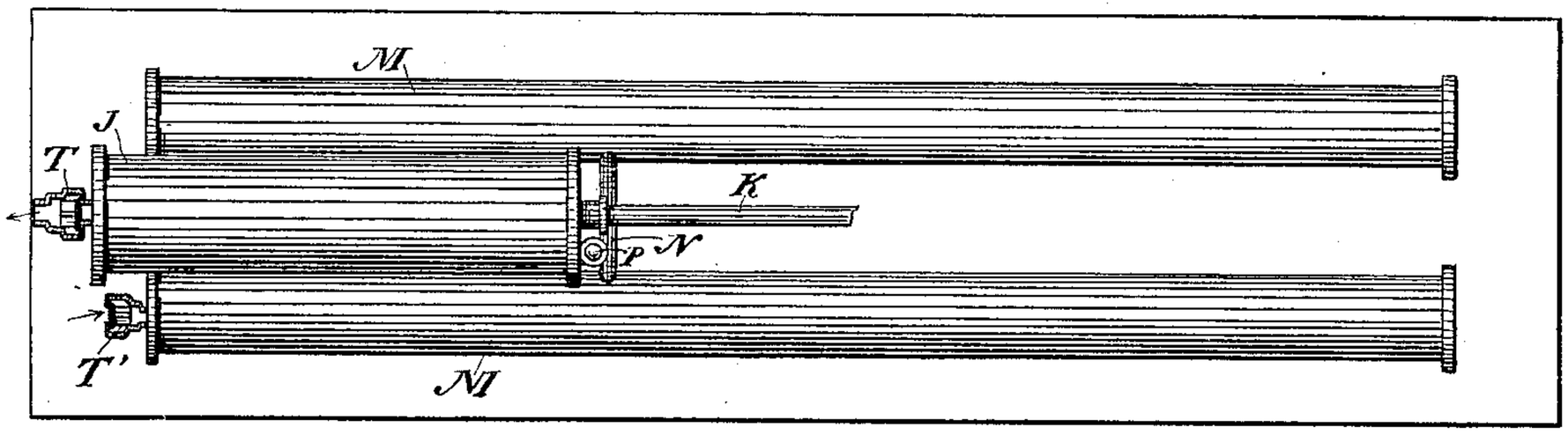
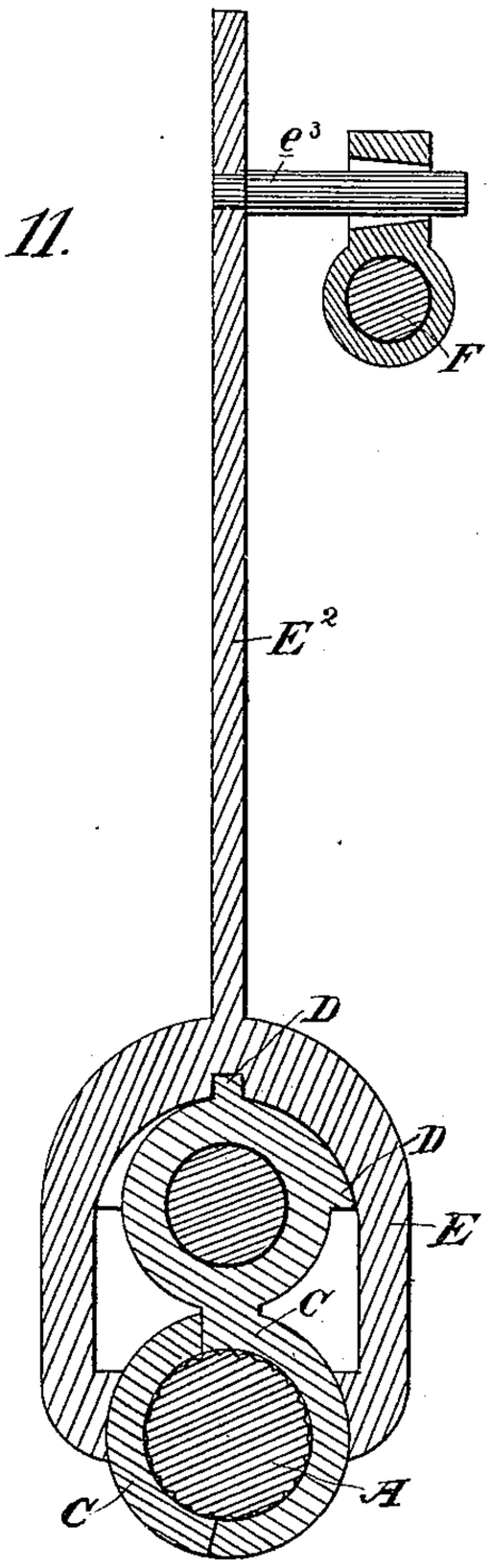


Fig. 11.



Witnesses,
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attys

UNITED STATES PATENT OFFICE.

GEORGE RISCHMULLER, OF SAN FRANCISCO, CALIFORNIA.

CABLE-RAILWAY GRIP.

SPECIFICATION forming part of Letters Patent No. 371,364, dated October 11, 1887.

Application filed February 15, 1886. Serial No. 192,049. (No model.)

To all whom it may concern:

Be it known that I, GEORGE RISCHMULLER, of the city and county of San Francisco, State of California, have invented an Improvement in Cable-Grips; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in cable-grips; and it consists in the combinations and constructions of devices which I shall hereinafter fully describe and claim.

Figure 1 is a side elevation of the car, showing a section of the cable-tube, part of one of the air-reservoirs broken away, and the wheels upon the side nearest the observer also removed to show the mechanism beneath the car. Fig. 2 is a side elevation of a portion of the car, showing the brake mechanism. Fig. 3 is a front end view of the car. Fig. 4 is a transverse section showing the operation of the gripping mechanism. Fig. 5 is a transverse section of the car, showing a section of the air-reservoirs, with connecting-pipe and valve for the operating-cylinder. Fig. 6 is an enlarged longitudinal section of one end of the operating-cylinder, showing the gland and piston-packing. Fig. 7 is an enlarged end view of the cylinder, showing the air-valve connection between the reservoirs and the cylinder. Fig. 8 is an enlarged view of the grip and other mechanism. Fig. 9 is a section showing the grip clasped upon the cable. Fig. 10 is a plan view showing the cylinders M M and the valves T T'. Fig. 11 is a section of the jaws C, showing the means for opening and closing them.

In my invention I employ a cable, A, having lugs or enlargements B formed with or affixed to it at regular intervals. These enlargements serve to hold the grip and prevent it from slipping along the cable. This grip consists of double clasps or jaws C C', having their upper ends pivoted upon a horizontal pin, so that they may open to free the cable or close and clasp it. Small lugs D are formed upon the upper portion of the jaws, which fit around the fulcrum-pin, and clutches E E' have corresponding hooks which engage these lugs when the clutches are drawn upward, so as to open the jaws and allow the cable to pass freely between them.

When the front jaws, C, of the device are pressed downward, they close about the cable, so that when the next enlargement B reaches them it will set them and the connected bar in motion. The rear grip shank has a pin, e', which runs along an incline, f', for two or three feet, then drops and closes behind the lug on the cable, and as both parts C C' have inwardly-projecting flanges at the outer ends the enlargements will be retained between them, as shown in Fig. 9. The inclosing devices E E' have the lower ends curved inward, as before described, so as to engage the lugs or projections D, by which the jaws C are opened, and they have shanks E^2 E^3 extending upward, as shown in Fig. 8. The rear shank has a pin, e', which, as before stated, holds the rear grip open by resting upon the inclined bar f' until after the forward grip has closed upon the cable, and the rear grip is closed only after the device has moved forward sufficiently to allow the pin to slip off the bar f'. By a lug, e^2, the rear shank, E^3, is raised simultaneously with the front one, so as to disengage both clutches at once.

The forward shank, E^2, has a pin, e^3, which is raised by means of a horizontal shaft, F, extending beneath the car parallel with the line of travel of the piston-rod, and having its ends held in arms or cranks G, fixed to a shaft, H, journaled parallel with it and extending to the front of the car, where it has the operating lever or mechanism I keyed to it. By turning this lever to one side the shaft F is caused to engage the pin e^3 and raise the grip-shanks, so as to open the grips and release them from the cable. By turning the said lever I in the opposite direction the forward shank, E^2, is lowered, while the rear one will lower subsequently, as before stated.

Fig. 11 shows a transverse section of one of the pairs of jaws, C, and the manner of opening and closing them. These jaws are pressed down by the action of the rod F. This rod has a sleeve sliding upon it, (partially shown in Fig. 8,) and the pin e^3 enters an eye in the projection above the sleeve. The opposite end of the pin e^3 is secured to the bar E^2, and when the rod F is moved up or down it will, through the pin e^3, move the bar E^2, the part E, and the jaws C, which are closed by the actual pressure thus exerted. The jaws C', which are behind the jaws C, as shown in Fig.

8, are closed by the simple dropping down of the part E′ by its own weight. The incline *f′* is located directly under one of the tracks on which the part L travels, and it extends rearwardly as far as the track does, being secured at its rear end. It extends forward, and is as much shorter than the track as the length of the part L. The peculiar construction of the parts E E′, as shown in Figs. 8 and 11, causes these parts to embrace the clamp portion C in a plane through its horizontal center and through that of the cable A as well. This will prevent any tendency of these parts to slip up and allow the jaws C to open.

When the front half of the grip is closed, the cable will travel loosely through it until one of the enlargements B strikes against the front of the grip, when that will be carried along with the cable. The reason for this is that the shoulder which forms a narrow hole in the front end of the jaw C is but a little larger than the thickness of the cable, while the interior of C will allow the enlargement B to enter it from the rear. By this construction it will be seen that as soon as the enlargement B arrives, it being thicker than the front of the opening through the jaws C, it will strike against the shoulder formed at this front part, and will thus carry the frame along with it, and the pin *e′* will follow it along the incline to the end, where it will drop the part E′ and its jaw C′, and thus allow that to close behind the enlargement B, which has already passed in, as before stated, to the front of the jaw C and is pressing against the shoulder formed at that point. The enlargement will then be inclosed within the jaws, as shown at Fig. 9. If, however, the jaws C, when closed, should close or open upon any of these enlargements in such a manner as to allow the latter to slip through, no effect would take place until the next of the enlargements arrived at the grip.

Beneath the car, toward its rear end, is fixed a horizontal cylinder, J, having a piston-rod, K, extending out toward the front end of the car, the rod K being connected with the frame L, by which the grip and its operating mechanism are supported.

Parallel with the cylinder J, and upon each side of it, is a cylindrical reservoir, M, which serves to contain air. These reservoirs are connected with each other by a pipe or passage, N, and they are connected with the front end of the cylinder by a pipe, O, having between it and the cylinder a valve, P, as shown in Fig. 7, by which air may be admitted from the reservoir into the cylinder, or from the cylinder to the reservoir. When the air is thus admitted into the cylinder, the piston Q (shown in Fig. 6) will be forced back to the rear end of the cylinder. The packing R is made of flexible material, like leather, fixed upon the periphery of the piston, its edges being turned over and fastened by means of a follower, as shown.

Openings are made from the interior to the space beneath the packing, so that when the air-pressure is admitted from the reservoirs it forces the packing out, so as to make a tight joint between it and the cylinder. The piston-rod may also be packed by means of a cup-leather, S, which embraces it just inside the cylinder-head, and the pressure of the air also acts upon this to make a tight joint at this point. When the piston stands at the rear end of the cylinder, there is no pressure in either cylinder or reservoirs.

The air-pressure in the reservoirs M is equal to that in the cylinder J in front of the piston (or nearly so) when the piston is moving. By means of a valve at point T opening outwardly from the cylinder, any leakage from the front of the piston backward escapes, and by a valve, T′, opening into reservoir M, any change in the equilibrium will be restored upon the return of the piston.

The operation will then be as follows: The piston being at the rear end of the cylinder J, the frame L, carrying the grip and traveling on guides, will be near the front end of the cylinder. The forward jaws of the grip, being closed upon the cable, will be engaged by the first enlargement or projection B upon the cable which arrives at the grip, and will be moved forward, carrying with it the frame and drawing the piston-rod and the piston in the cylinder J. This action compresses the air in the cylinder and forces it through the valve P into the reservoirs, and forms an air cushion to prevent a sudden shock by reason of the lugs striking the grip too abruptly. When the air has been compressed in the cylinder J sufficiently, the strain will be gradually transferred to the car, which will then be started and drawn along by the rope, the rear portion of the grip having also closed, as before described. When it is desired to stop the car, the grip is unclosed, thus allowing the cable to run freely without engaging it, and the car, being released from the draft upon it through the grip, will stop. The piston is allowed to move back by opening the valve P by means of the hand-lever *q* at the front of the car, through a rod, *h*, and a transverse lever, *i*. The brakes may be applied to the wheels and the track, so as to stop the car readily when the grip is released. The brakes are operated by the grip mechanism or by a foot-lever, U, having a connecting rod, V, extending back to the lower end of a lever, W, as shown in Fig. 2. This lever has its fulcrum at X and its upper end is connected by a rod, Y, with one arm of a bell-crank lever, Z. The opposite arms of the two levers Z carry shoes *a*, which act upon the car-wheels, and the angles of the levers are connected with the track-brakes *b*, as shown in Fig. 2. The two levers Z have their angles united by a rod or bar, *c*, and the action will be to press the shoes against the adjacent faces of the car-wheels, when they act as fulcrums, about which the levers Z move downward in unison, so as to force the track-brakes *b* into contact with the rails, thus providing a double brake at one operation. The

part *b* is held up by the same link which holds the shoe *a*. If operated by the grip, the latter, in moving back, causes a cross-bar, *j*, (see Figs. 2 and 8,) to engage a hook, *k*, upon a bar attached to the lower end of the lever U, thus producing the same result as before described. The hook is released to allow the grip to run entirely back by the rod I′ at the front of the car.

In order to stop the car in case of any person or article falling upon the track in front of it, an arm, *d*, projects forward, having a bar across its front end, which extends beyond the line of the track upon each side, being held up, so as not to drop entirely upon the track, by a transverse bar or support, *e*, Fig. 3, and extending beneath the car. The rear end is provided with a cross-bar, o^2, supporting a weight, as shown at *f*. This weight is fixed upon a rod or lever, *m′*, which actuates a lever, *m*, as shown in Fig. 3, and this lever acts, through a chain, *n*, to turn the shaft H and the rod F, so as to open the grip and unclasp it from the cable when the arm *d* is moved back by striking an object, and at the same time the device acts to apply the brake, as before described, by means of the bar *j* and the hook *k*. An arm, *p′*, has a lug, *q′*, which engages the bar o^2, by which the weight *f* is held up, and this arm *p′* extends backward and has a curved hook or end, which is formed so as to rest upon cam-lugs *r′* upon the car-axle, allowing it to revolve forward freely; but if the car should run backward, as by accident upon a grade, the cams would engage the hook and, acting upon it and the rod *p′*, would release the weight and allow it to act as before described.

The cable is held as nearly level as possible by a series of pulleys, *s′*, supported at short intervals apart by weighted angle-levers *t*, which are fulcrumed below the cable, as shown in Fig. 1. The weight will normally rest upon supports which hold all the pulleys at nearly or quite the same height, so that the cable carried by them may be readily seized by the grip-jaws; but when these jaws arrive at the pulleys they readily depress them, so as to pass.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The air-cylinder having a piston and piston-rod connected with the grip-frame, as shown, in combination with the reservoir or reservoirs having a passage connecting with the air-cylinder and a valve with an ingress and an egress passage, substantially as herein described.

2. The air-cylinder, with its piston-rod connected with the grip-supporting frame, and the reservoirs connecting with the cylinder, as shown, in combination with the levers and intermediate connecting-rods, whereby the grip may be engaged or disengaged and the piston caused to move within the cylinder, substantially as herein described.

3. The grip composed of double jaws turning about a horizontal pin or fulcrum, and having lugs at their upper sides, in combination with a mechanism engaging the lugs, so as to close or open the jaws when depressed or raised, substantially as herein described.

4. The grip-jaws, with their operating mechanism, consisting of the clutches E and E′, the vertical shanks E^2 E^3, and the pin e^3, whereby they close and unclose, as shown, in combination with the shaft extending beneath the car, carrying the crank-arm G, whereby the jaws are operated by the handle or lever at the front of the car, substantially as herein described.

5. In combination with the gripping mechanism, a cylinder having a piston and connected with said mechanism so as to form an elastic cushion for it and a brake for stopping the car, and an arm or arms extending forward from the car, having a transverse bar at the front, the rear ends being connected with the grip operating and brake mechanism, substantially as herein described.

6. The gripping apparatus supported by a frame which is connected by a piston-rod with a piston moving in a cylinder with air-reservoirs connecting with said cylinder, as shown, in combination with the elastic or flexible packing fixed upon the periphery of the piston and having its edges fastened by a follower, substantially as herein described.

7. The arm or bar projecting to the front of a car, having a transverse bar for clearing the track at its front end and at its rear end a second bar, in combination with a weighted lever supported by this second bar and connected by chain or chains with the shaft through which the grip is operated, substantially as herein described.

8. The weighted lever having its ends supported upon a bar, o^2, as shown, in combination with an arm, *p′*, having a lug engaging this bar, and cams or lugs *r′* upon the wheel-axle, by which this bar is made to disengage the weight when the car runs backward, substantially as herein described.

9. In combination with the traveling grip-carrying frame, the air-cylinder connected therewith, the grips C C′, actuating-jaws E E′, and vertically-moving bars E^2 E^3, the hook *k*, whereby the grip-frame may be prevented from moving backward, and a connection with said hook from the grip-actuating mechanism, by which it may be raised and the grips allowed to move backward, substantially as herein described.

In witness whereof I have hereunto set my hand.

GEORGE RISCHMULLER.

Witnesses:
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H. C. LEE.