

(No Model.)

2 Sheets—Sheet 1.

J. H. PENDLETON.

GRIPPING DEVICE FOR CABLE RAILWAYS.

No. 387,993.

Patented Aug. 14, 1888.

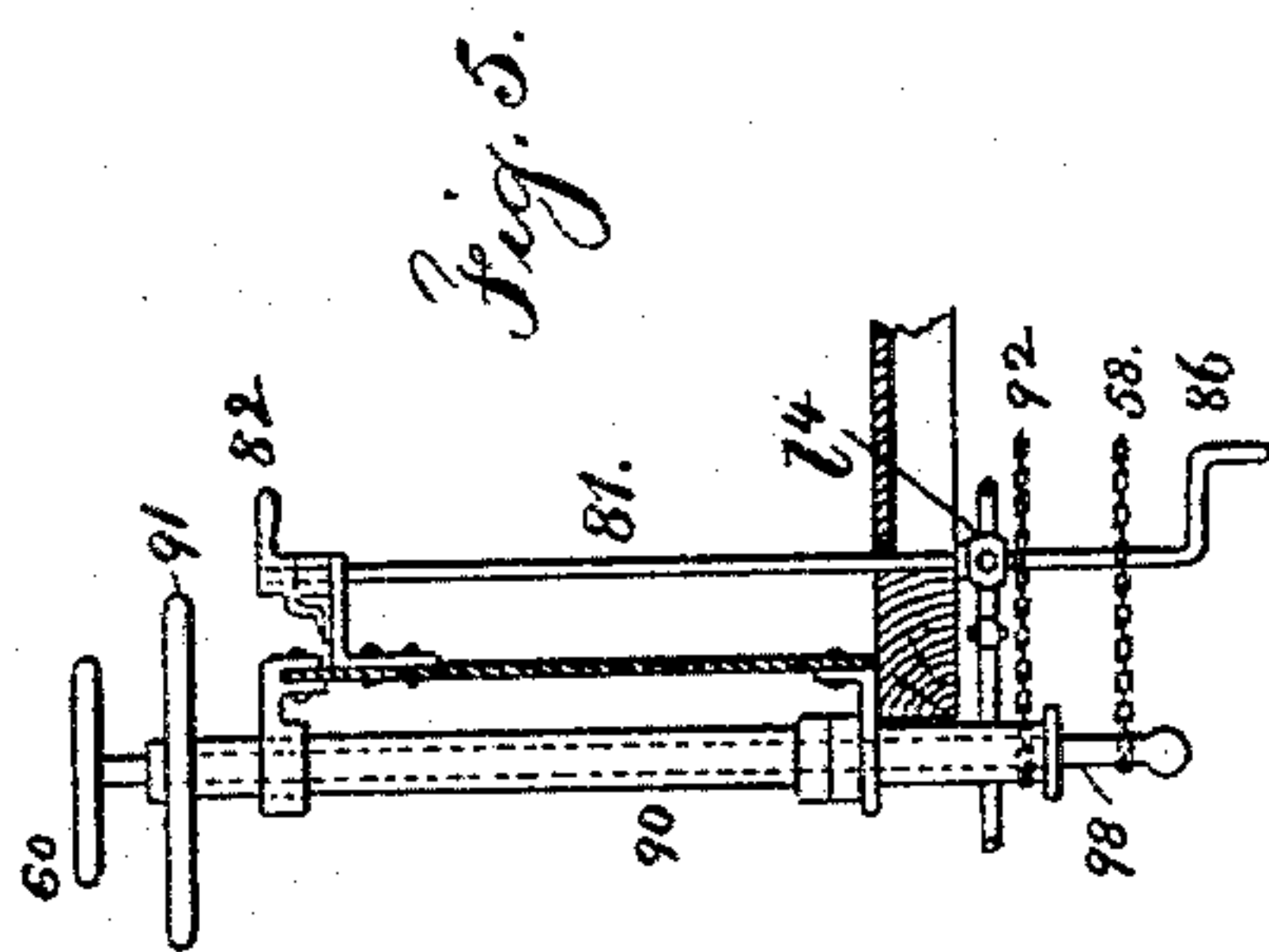
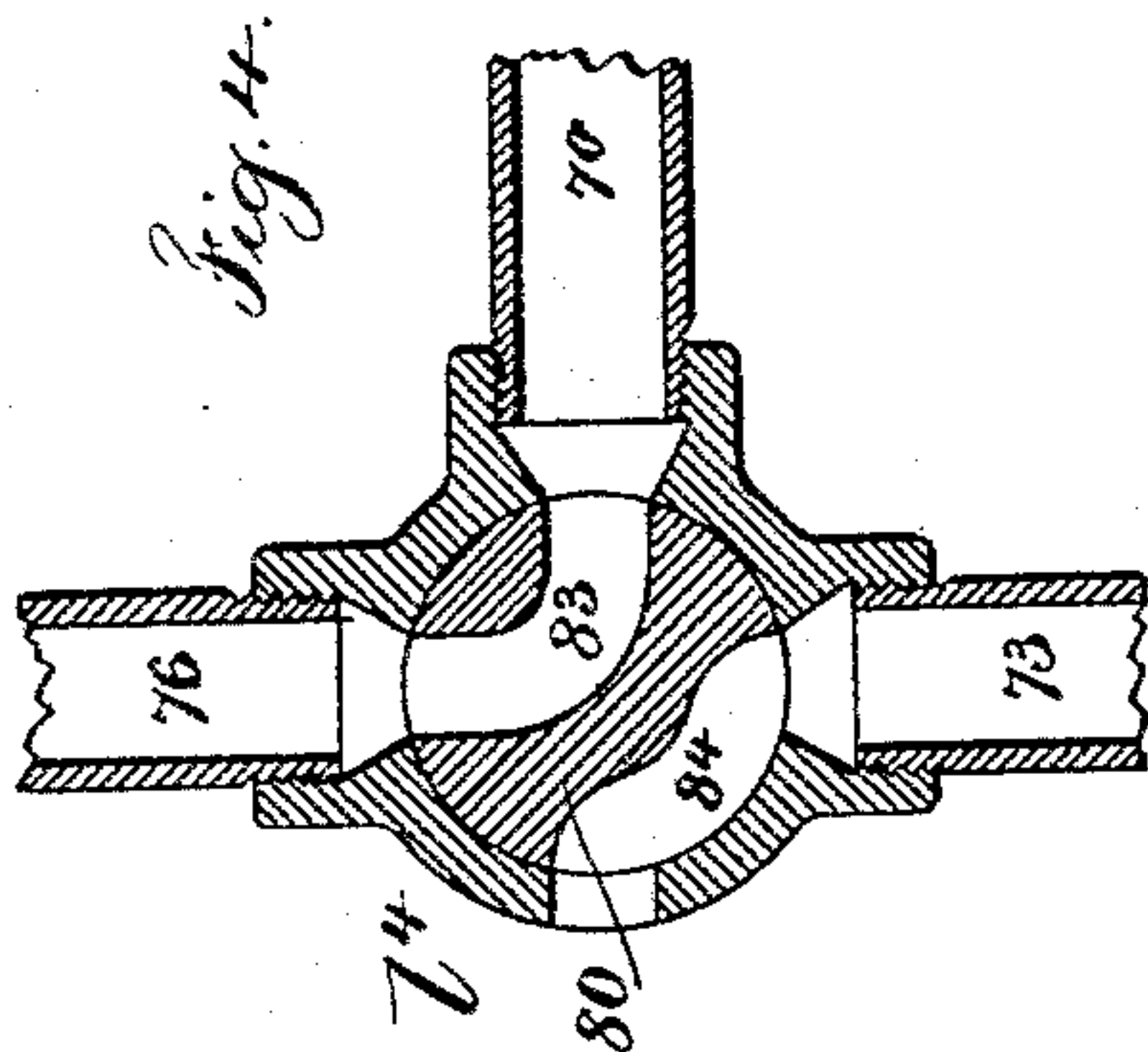
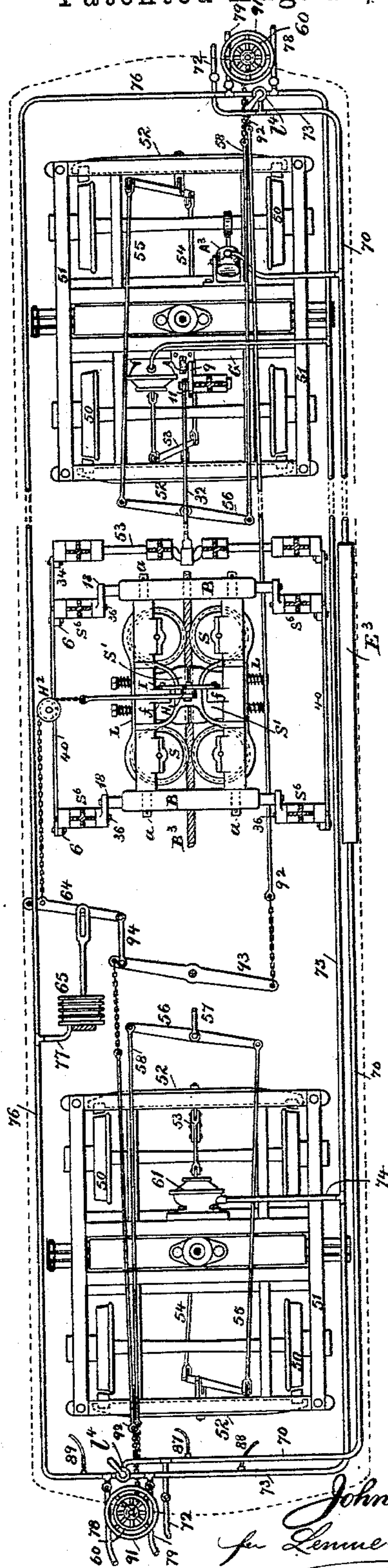


Fig. 1.



Witnesses:

Chas. H. Smith.  
J. Staib.

Inventor.

John H. Pendleton.

per Lemuel W. Serrell.

(No Model.)

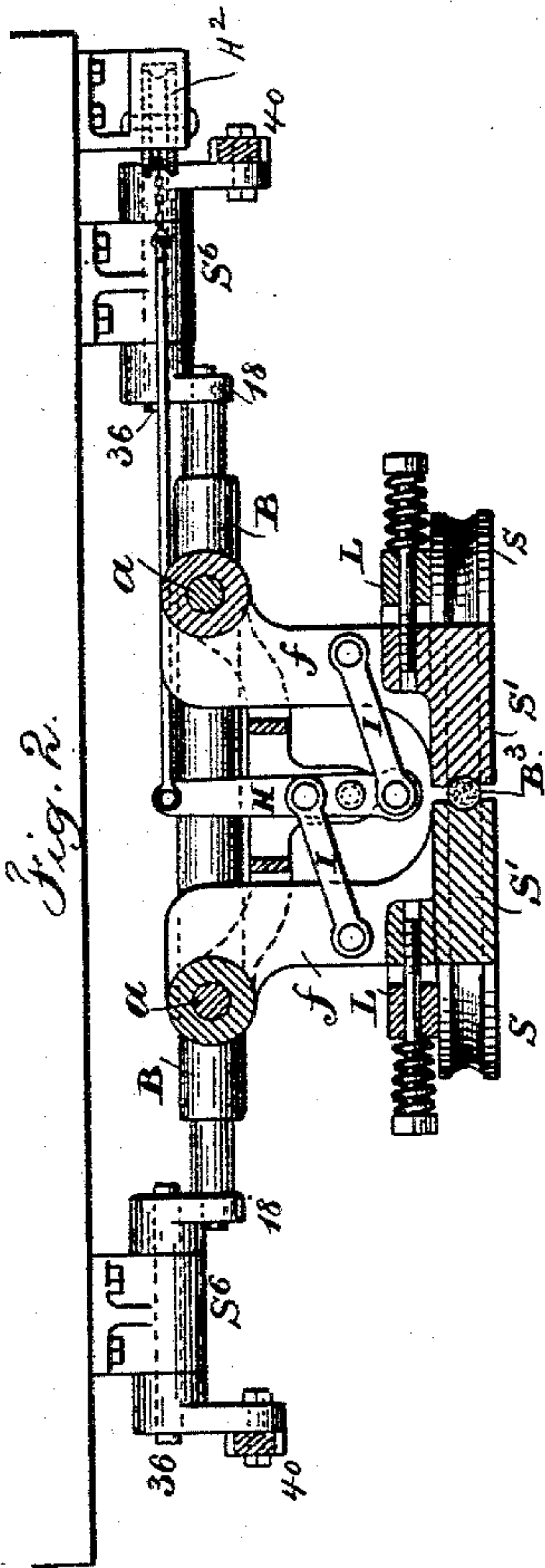
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J. H. PENDLETON.

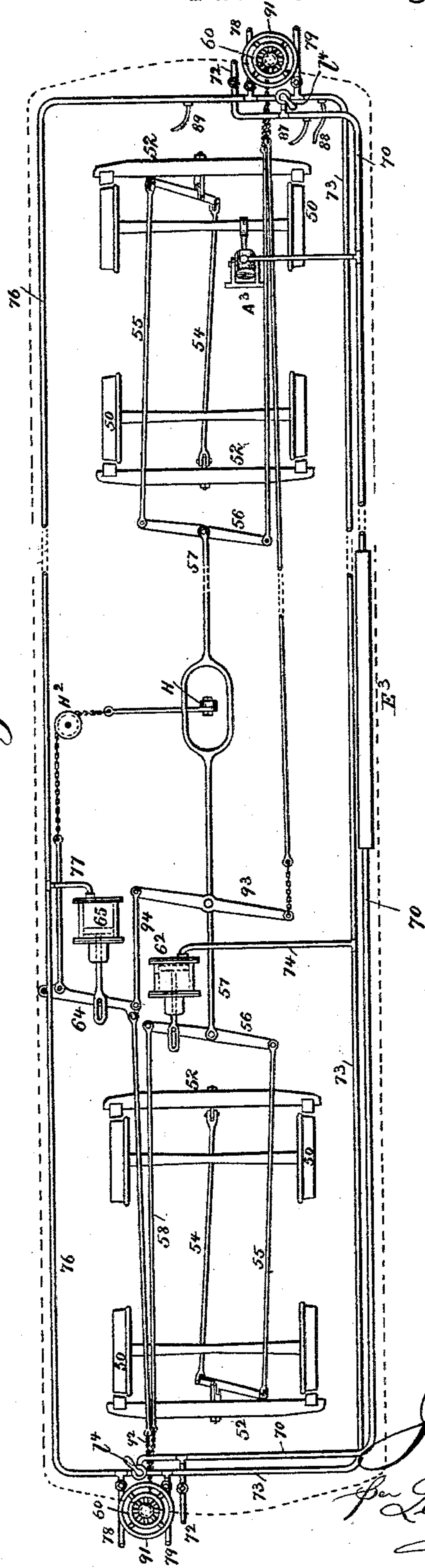
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*Fig. 3.*



Witnesses.

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*att.*



# UNITED STATES PATENT OFFICE.

JOHN H. PENDLETON, OF BROOKLYN, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE RAPID TRANSIT CABLE COMPANY, OF NEW YORK, N. Y.

## GRIPPING DEVICE FOR CABLE RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 387,993, dated August 14, 1888.

Application filed December 13, 1886. Renewed June 13, 1888. Serial No. 276,933. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. PENDLETON, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Greeting Devices for Cable Railways, of which the following is a specification.

In my application, Serial No. 218,032, filed November 5, 1886, I have represented devices by means of which the rigid grip and roller-grips can be raised and lowered in relation to the car-body, so as to be maintained at a uniform height from the track, regardless of the rise and fall of the car by the varying load upon the same; and in my application, Serial No. 221,416, filed December 13, 1886, rigid gripping-jaws are shown in connection with gripping-rollers, brake-bars, and springs, whereby one lever is made use of in first pressing the grip-rollers upon the cable, then applying the brakes to the same so as to start the car by the action of the traveling cable upon the grip-wheels, and then the gripping-jaws are applied to firmly grasp said cable.

I have shown in the present application portions of the devices set forth in the foregoing applications sufficiently to illustrate the connection of my present improvements with the same.

My present invention relates to means for applying atmospheric air under pressure or by an exhaust to the grip mechanism for grasping the cable, and this is accomplished after the brakes have been released from the car-wheels, or the brakes are applied to the car-wheels after the gripping mechanism has been released, so that by this improvement the cable-grip and the car-brake are caused to operate in unison.

This is an improvement upon the devices shown in my patent, No. 351,124, granted October 19, 1886, by which the parts are simplified, the operations rendered more reliable, and in which but little changes have to be made upon the ordinary atmospheric brakes of cars in combining with the same a cable-grip.

In the drawings, Figure 1 is a diagrammatic plan view illustrating the improvements as if the car-platform were removed. Fig. 2 is a cross-section in larger size through the cable-

grip. Fig. 3 is a partial diagrammatic plan view illustrating the modifications that are required when air under pressure is made use of instead of an exhaust. Fig. 4 is a section in larger size of a four-way cock made use of in operating the brake and gripping devices; and Fig. 5 is an elevation of the wheels for acting upon the grip and brake by hand, and also of the lever and connection for the four-way cock.

The gripping-jaws  $S'$  are suspended by the arms  $f$  from the pivot-bolts  $a$ , and the lever  $H$  and links  $I$  are made use of for applying the grip-rollers  $S$  through the medium of the brake-bars  $L$  and springs before the gripping-jaws  $S'$  firmly grasp the cable  $B^3$ , and by the movement of the lever  $H$  in the opposite direction the cable is released. A more full description of these devices is contained in my application, Serial No. 221,416, filed December 13, 1886.

The pivot-bolts  $a$  are suspended by the cross-bars  $B$ , cranks 18, and shafts 36 in the hanging standards  $S^6$ , that are bolted to the under side of the car-platform, and the cross-shaft 53, having a crank upon the same, is connected by the rod 32, crank 9, and link 11 with the cross-bearer  $G$  upon the truck, and the cranks 34 6 and rods 40 serve to move the shafts 36 and cranks 18 and support the gripping device at a uniform height above the track, regardless of the rise and fall of the car when loaded or in motion. A more full description of this feature is contained in my aforesaid application, Serial No. 218,032.

The car-wheels 50 and trucks 51 are of any ordinary construction, and the brake-beams 52 are provided with brake-shoes, as usual, and the lever 53 is connected by the rod 54 between the brake-levers and by a rod, 55, to a lever, 56, and the levers 56 at the respective trucks are connected by the rod 57 and by the rods and chains 58 to the respective vertical staffs having hand-wheels 60 on their upper ends. These braking devices and their connections are of ordinary construction, and where an exhaust-diaphragm, 61, is made use of the same may act between the respective brake-bars, as seen in Fig. 1, to draw them toward each other and apply such brakes inde-



pendently of the hand-power, or where the atmosphere acts by pressure within the cylinder 62, Fig. 3, it applies the brakes on both the trucks through the levers and connecting rods.

5 At A<sup>3</sup>, I have shown a pump acted upon by an eccentric on one of the axles to either exhaust the air from the reservoir E<sup>3</sup> or to force air into the same, and such pump may be constructed as shown in my said patent, No. 10 351,124. The chain from the lever H passes around the pulley H<sup>2</sup> to the lever 64, and this lever 64 is acted upon by the air-pressure in the cylinder or bellows 65.

15 It is now to be understood that my invention relates principally to the combination, with the devices in my former applications and brake mechanism before known, of pipes and cocks arranged to admit the air to the respective cylinders, diaphragms, or bellows to 20 apply the brake at a time the grip has been released or to apply the grip after the brake has been liberated.

The pipe 70 connects with the pump A<sup>3</sup> and with the air-reservoir E<sup>3</sup>, and it extends around 25 the car-platform to the four-way cocks L<sup>4</sup> at the respective ends of the car and to the branches and flexible coupling-tubes 72, that extend from one car to the other. The pipe 73 passes from one four-way cock L<sup>4</sup> to the other, and it has a 30 branch or branches, 74, to the diaphragm 61 or to the cylinder 62, and the pipe 76 extends also from one four-way cock L<sup>4</sup> to the other, and it has a branch, 77, leading to the bellows 65, Fig. 1, or the cylinder 65, Fig. 3, and this 35 pipe 76 has a branch and flexible tube, 78, leading to the same pipe on the next car, and the branches and flexible tubes 79, also at the ends of the car, connect the pipe 73 of the respective cars.

40 Upon reference to Figs. 4 and 5 it will be seen that the plug 80 of the four-way cock L<sup>4</sup> is connected with the vertical shaft 81 and can be turned by a lever or hand-wheel, 82, and in this are two passage-ways, 83 and 84.

45 In the position represented in Fig. 4 the atmosphere is admitted through the passage-way 84 into the pipe 73, and hence the brake mechanism is not in operation, there being neither suction nor pressure in 61 or 62; but 50 the atmosphere is allowed to act from the reservoir E<sup>3</sup> through the pipe 70, passage-way 83, and pipe 76 upon the grip mechanism, through the medium of the bellows 65, Fig. 1, or the cylinder 65, Fig. 3, to grasp the traveling cable. When the four-way cock L<sup>4</sup> is 55 turned so that the passage-way 83 connects the pipes 70 and 73, the atmosphere will pass freely through the passage-way 84 into the pipe 76 and relieve the grip mechanism, and at 60 the same time the vacuum or heavy pressure in the reservoir E<sup>3</sup> will act, through the pipes 70 and 73 and branch 74, to apply the brakes by means of the cylinder 62 or the diaphragms 61.

65 It will be apparent that whatever atmospheric condition is set up in the pipe 73 or 76 of one car will be communicated to the simi-

lar pipes in the adjoining cars by the flexible couplings; but cocks or valves should be applied to these flexible couplings, as shown, to 70 stop off the connection between one car and the next or to close the pipes at the ends of the train.

If the train is drawn by a grip upon one car only, then it will not be necessary to connect 75 the pipe 76 to the adjacent cars; but the pipes 70 and 73 may be connected to the adjacent cars, so as to operate the air-brakes upon such cars.

In cable railways there usually are places 80 where it is necessary to drop the cable, such as at the terminus and at crossings. This may be accomplished automatically by the stem 81 of the four-way valve L<sup>4</sup> being extended below such valve and formed with a crank-arm, as 85 at 86, to be acted upon by a stationary lateral incline or cam upon the track between the rails, to turn the plug 80 at the proper time for dropping the cable; and a stationary in- 90 cline, acting in the other direction, may be made use of to act upon the arm 86 and turn the plug 80, so that the vacuum or air-pressure will act upon the grip and cause the same to grasp the cable.

In some cases I prefer to employ gages upon 95 the car in a position convenient for the attendant to observe the minus or plus pressures in the respective pipes. Such gages are to be of any ordinary character, similar to steam-gages, and the branch pipes 87, 88, and 89 from the 100 respective pipes 70, 73, and 76 are to lead to such gages.

I provide for operating the grip by hand in case of any accident to the air-pressure mechanism, and as a convenient means for accom- 105 plishing this object I use a sleeve or pipe, 90, around the staff 98, with a hand-wheel, 91, and the chain 92 passes from the lower part of this tube to a rod that unites with the lever 64 at one end of the car, and the tube 90 at the other 110 end of the car and its chain 92 are connected to the lever 93 and link 94 to the lever 64, so that said lever 64 can be operated from either end of the car by hand in applying or releasing the grip mechanism. If the plug 80 of the 115 four-way cock receives a movement of about forty-five degrees, it will shut off the air-passage between the pipes 70 and 76 without opening the passage-way for the exhaust or air-pressure to act in the pneumatic brake mech- 120 anism, thereby allowing the atmospheric action to be taken off the pneumatic grip mechanism without applying the pneumatic action to the brake mechanism, or the reverse.

I do not require any mechanism to take off 125 the grip as the brake is applied, as in my Patent No. 351,124, and only one cock is made use of; hence it is impossible to direct the air into the grip-actuating device while the air remains upon the brake, or the reverse, thus 130 lessening the risks of injury to the apparatus by carelessness. The continuation of the movement in one direction takes off the grip and applies the brake, or the reverse. By combin-



ing the hand-wheels and shafts and the chains with the pneumatic devices, as shown, the pneumatic action can be supplemented by hand-power, so that if the grip should slip  
 5 when held by the pneumatic action it can be tightened by hand, and in cases of emergency the brakes can be tightened by hand simultaneously with the pneumatic action, thus giving the driver or attendant a more reliable  
 10 control of the car than by the pneumatic apparatus alone.

I claim as my invention—

1. The combination, with the car-brakes and an independent pneumatic device for ap-  
 15 plying the brake or releasing it, of the grip mechanism, a cylinder or bellows for actuating the grip pneumatically or releasing the same, and the connecting pipes or tubes and a four-way cock that directs the pneumatic ac-  
 20 tion in applying and releasing the brake and grip, respectively, and in unison, whereby the brake cannot be applied without releasing the grip, and vice versa, substantially as specified.

2. The combination, with the car, of a pneu-  
 25 matic reservoir or vessel containing air under pressure or from which the air is exhausted, a four-way cock having one opening to the atmosphere, a pipe connecting the said cock with the pneumatic vessel, grip mechanism  
 30 and brake mechanism, and separate pneumatic appliances for actuating such grip and brake mechanism, respectively, a pipe leading from the pneumatic grip mechanism to the four-way cock, and a pipe leading from the pneumatic  
 35 brake mechanism to the four-way cock, so that the cock directs the pneumatic action in applying and releasing the brake and grip, respectively, and in unison, whereby the brake cannot be applied without releasing the grip,  
 40 and vice versa, and a hand-wheel and staff for operating the brake mechanism when necessary, substantially as specified.

3. The combination, with the car, of a pneu-  
 45 matic reservoir or vessel containing air under pressure or from which air is exhausted, a four-way cock having one opening to the atmosphere, a pipe connecting the said cock

with the pneumatic vessel, grip mechanism and brake mechanism, and separate pneumatic  
 50 appliances for actuating such grip and brake mechanism, respectively, a pipe leading from the pneumatic grip mechanism to the four-way cock, and a pipe leading from the pneumatic  
 55 brake mechanism to the four-way cock for applying the grip and releasing the brake, or the reverse, by one movement of the cock in one direction or the other, and a hand-wheel, staff, chain, and connection for applying the  
 60 grip mechanism by hand, substantially as set forth.

4. The combination, with the car, of a pneu-  
 matic reservoir or vessel containing air under pressure or from which air is exhausted, a four-way cock having one opening to the at-  
 65 mosphere, a pipe connecting the said cock with the pneumatic vessel, grip mechanism and brake mechanism, and separate pneumatic appliances for actuating such grip and brake mechanism, respectively, a pipe leading from  
 70 the pneumatic grip mechanism to the four-way cock, and a pipe leading from the pneumatic brake mechanism to the four-way cock, where-  
 75 by the brake can be applied and the grip released, or the reverse, by the movement of the cock, a staff, hand-wheel, and chain for oper-  
 80 ating the brake mechanism by hand, and a hand-wheel and tube surrounding the staff, and a chain connecting such tube with the grip mechanism, substantially as set forth.

5. The combination, with the brake and its  
 80 pneumatic actuating mechanism, of a cable-gripping mechanism and pneumatic device for actuating the same and a cock and mechanism for actuating the same and regulating  
 85 the pneumatic action automatically for dropping the cable or in grasping said cable, substantially as set forth.

Signed by me this 11th day of December, 1886.

J. H. PENDLETON.

Witnesses:

GEO. T. PINCKNEY,  
 WILLIAM G. MOTT.