

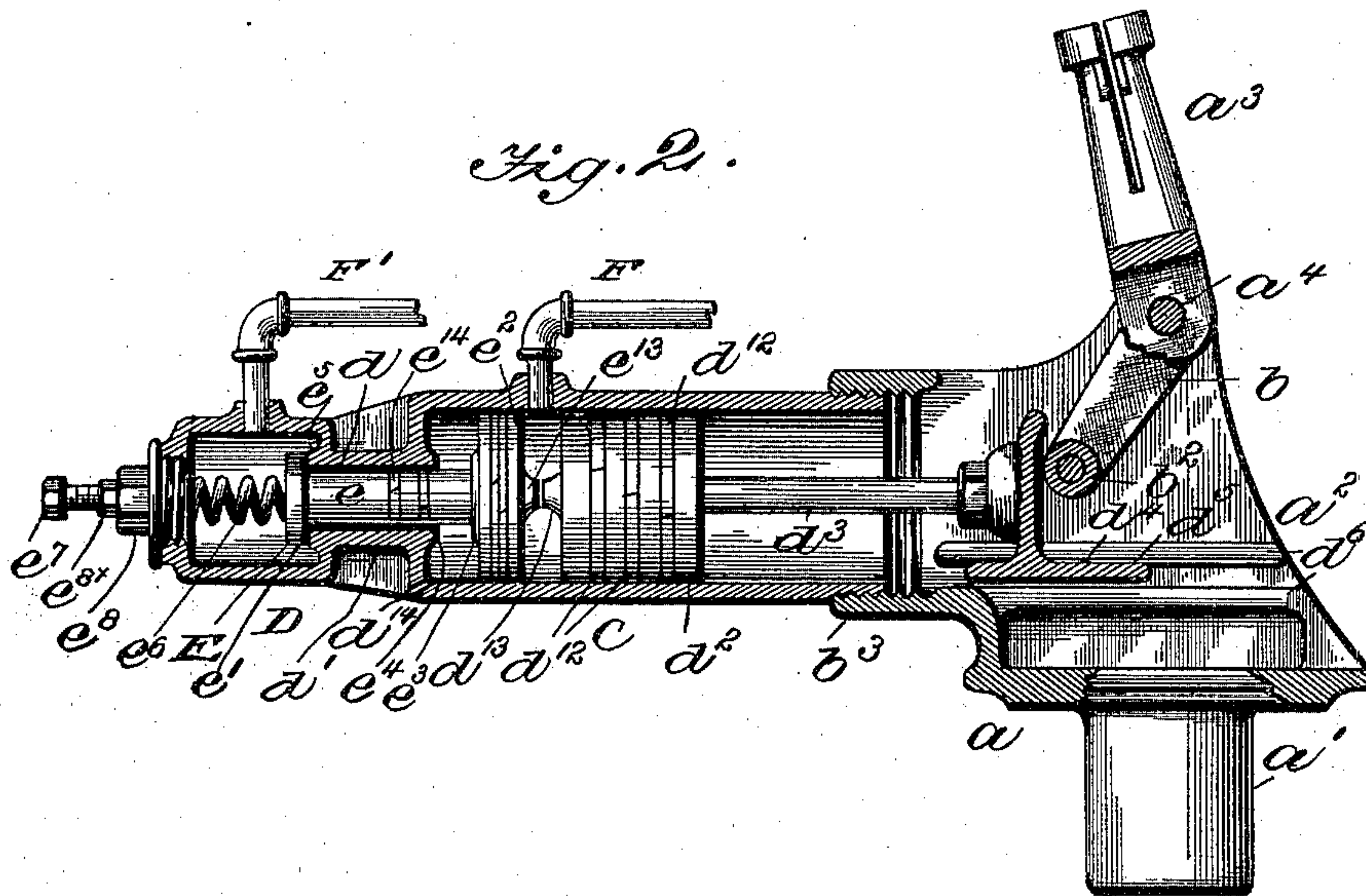
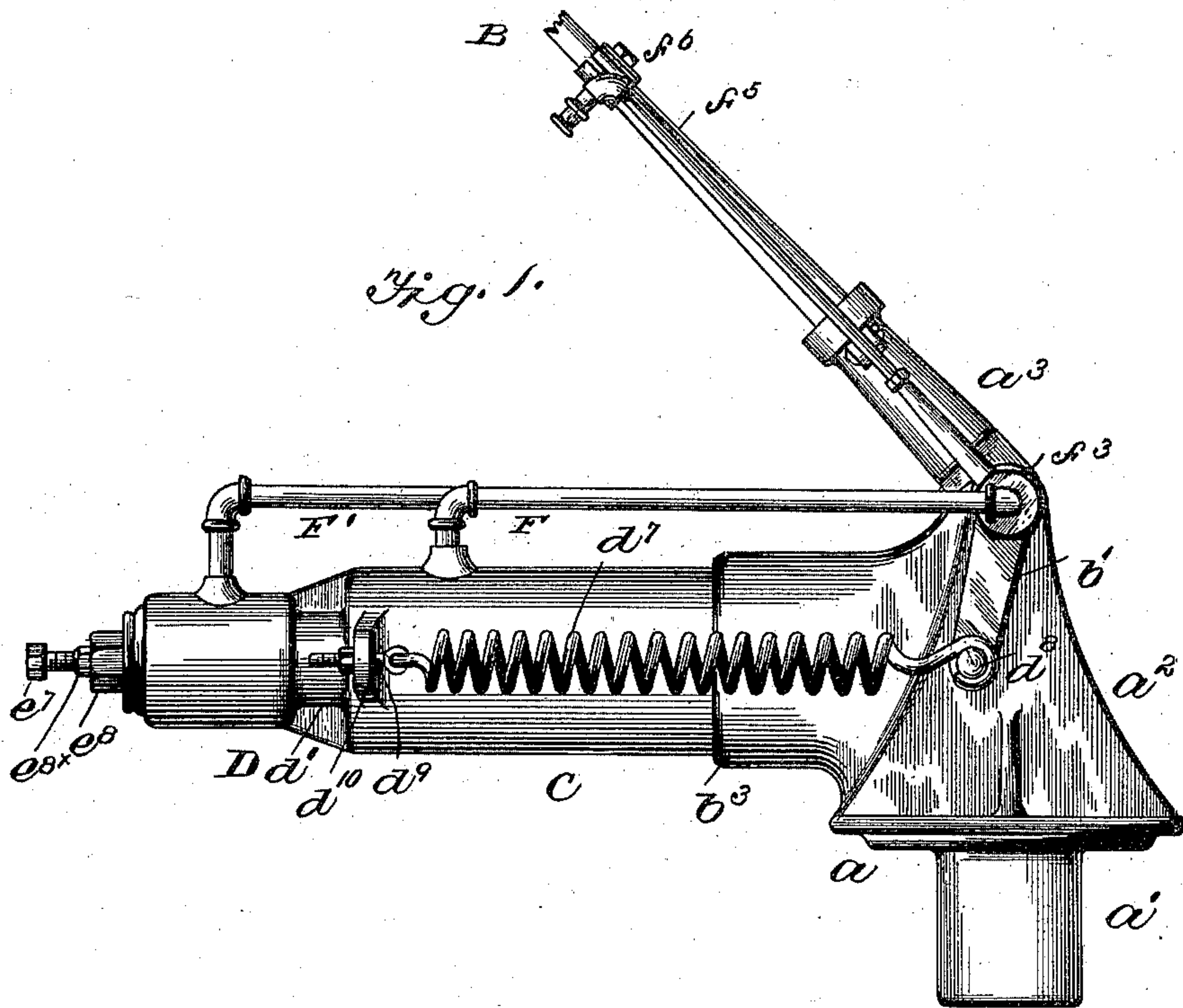
(No Model.)

2 Sheets—Sheet 1.

H. P. WELLMAN.
TROLLEY FOR ELECTRIC RAILWAY CARS.

No. 558,869.

Patented Apr. 21, 1896.



Witnesses
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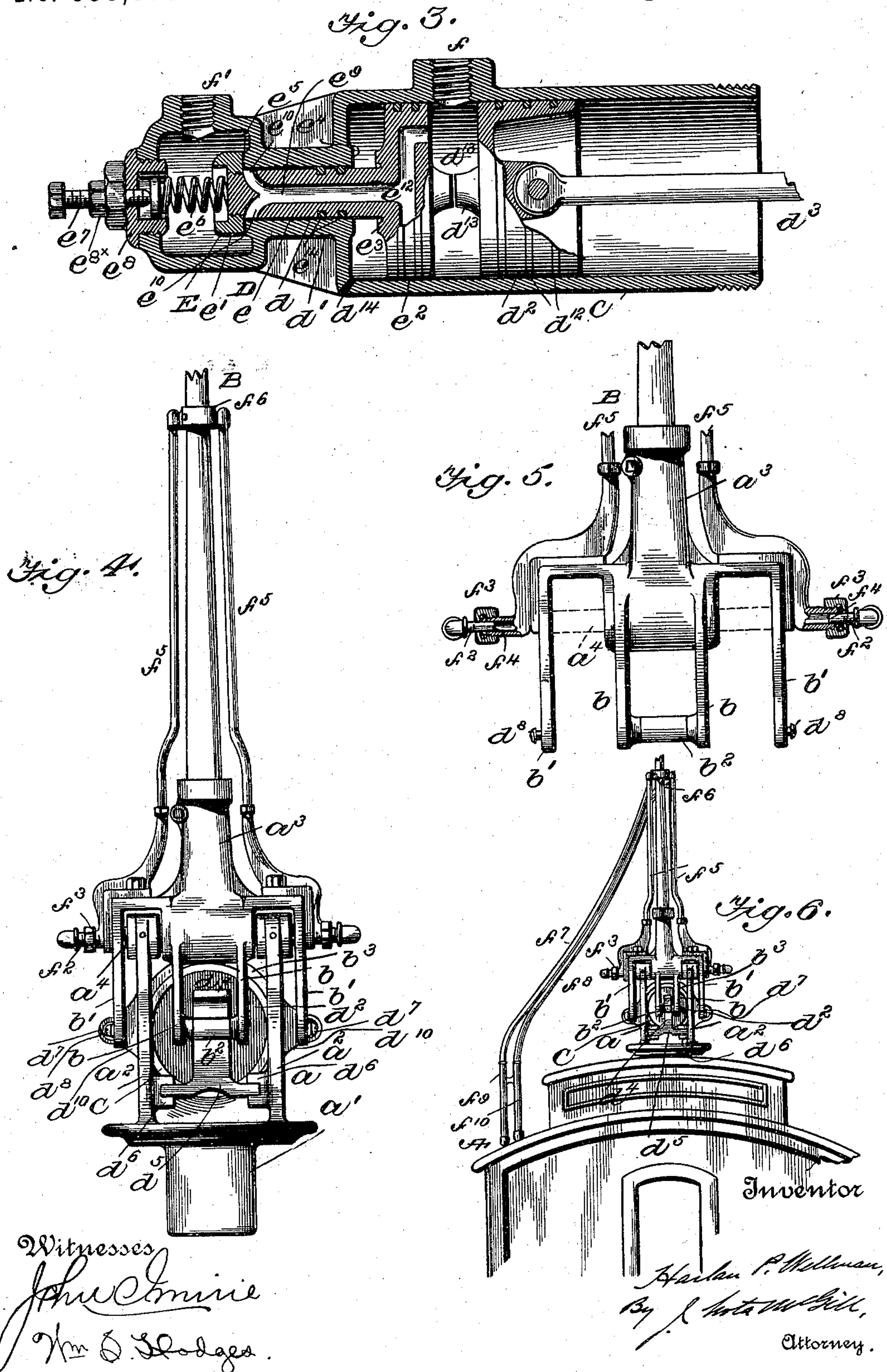
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UNITED STATES PATENT OFFICE.

HARLAN P. WELLMAN, OF ASHLAND, KENTUCKY.

TROLLEY FOR ELECTRIC-RAILWAY CARS.

SPECIFICATION forming part of Letters Patent No. 558,869, dated April 21, 1896.

Application filed October 1, 1895. Serial No. 564,314. (No model.)

To all whom it may concern:

Be it known that I, HARLAN P. WELLMAN, of Ashland, in the county of Boyd and State of Kentucky, have invented certain new and useful Improvements in Electric-Railway Cars; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention contemplates certain new and useful improvements in electric-railway cars.

As is well known, the trolley-poles of electric cars are pivotally mounted at their lower ends and have trolley-wheels on their outer free ends, which are designed to be held in engagement with the overhead trolley-wires by springs acting on said poles. In the event of the trolley-wheel jumping or flying off the wire the pole immediately flies upward and assumes an approximately vertical position. It is frequently a matter of much care and annoyance for the motorman or conductor to return the trolley-pole to position with the wheel thereof beneath the trolley-wire to permit of reengagement. This also consumes much time. The object of the present invention is to overcome these difficulties and annoyances by providing for the automatic lowering of the trolley-pole immediately after the wheel jumps the wire, whereby said pole will be brought to a horizontal or other position with the wheel beneath the wire, permitting of its easy reengagement with the latter. This object I accomplish by a pneumatic pressure device under the control of the motorman or his assistant. The device is attached to the pivoted base on which the trolley-pole is swiveled, and it embraces a piston with one end of the rod of which the lower end of the trolley-pole beneath the pivot thereof is normally held in engagement, and also a reservoir between which and the piston-chamber is a valve normally held to its seat, closing communication with said chamber. Immediately upon the trolley-wheel flying off the wire and the pole assuming an upright position the piston effects the unseating of said valve and the admission of pressure to said chamber, which pressure acting on said piston will cause the lowering of the trolley-pole, so that the wheel thereof can be

easily brought into reengagement with the trolley-wire.

The invention will be hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation showing the lower end of a trolley-pole and its base with my improved attachment. Fig. 2 is a vertical longitudinal sectional view thereof with the trolley-pole at an angle different from that shown in Fig. 1. Fig. 3 is an enlarged view of the pneumatic pressure device, parts being broken away and others shown wholly and partly in section. Fig. 4 is an end view. Fig. 5 is an enlarged view of the trolley-pole socket and its adjuncts. Fig. 6 is an end view of a portion of a car, showing my improved device attached thereto.

Referring to the drawings, A designates a car-roof, *a* a trolley-pole base, and *a'* a depending cylindrical extension by means of which the base is pivoted or swiveled on the car-roof. From this base project two parallel uprights *a*², between which is located the socket *a*³ of trolley-pole B, the swiveling-bolt *a*⁴ being supported at its ends by said uprights. With this socket end are formed, or they may be rigidly secured thereto, inner and outer depending arms *b* *b'*, which are parallel with the uprights *a*² and are set at a slight angle to the socket *a*³, said arms being passed down on either side of each upright. A roller *b*² is pivotally mounted between the lower ends of the inner arms *b*. The tubular socket *a*³ is designed to accommodate and hold fast the lower end of the trolley-pole.

C is a compressed-air cylinder, which at one end is firmly secured to a tubular portion *b*³ of base *a*, said tubular portion extending outwardly from the uprights *a*². To the outer end of said cylinder is attached an air-reservoir D, which communicates with the cylinder through a circular passage-way *d*, formed in a narrowed connecting-neck *d'*. Within the cylinder C is a piston *d*², whose rod *d*³ has a shoe *d*⁴ secured to its outer end, the lateral flanges *d*⁵ of the base of said shoe fitting in opposite guideways *d*⁶, which consist of grooved strips attached to or formed with the uprights *a*². With the outer face of this shoe the roller *b*² of the trolley-pole normally engages. The trolley-pole is constantly under

the tension of two coil-springs d^7 , which at one end engage headed studs d^8 on the lower ends of the outer arms b' of socket a^3 , the other ends of said springs being held by adjustable screws d^9 , working in lugs d^{10} on the exterior of cylinder C. The piston d^2 is surrounded by spring packing-rings d^{12} , and from the center of its inner face projects a lug d^{13} . A vent-opening d^{14} is formed in one end of this cylinder.

E is a valve for controlling the admission of air from the reservoir to the air-cylinder and is movable in the passage-way between said reservoir and cylinder. It comprises a cylindrical neck e , a valve-disk e' at the end projecting into the reservoir, and a piston e^2 on the other end located and movable within the air-cylinder. A flange e^3 on the piston e^2 surrounds the end of neck e and is designed to contact with seat e^4 at one end of the passage-way, while the valve-disk e' contacts with the seat e^5 at the other end thereof. The valve-disk e' is normally held against its seat by a spring e^6 , the tension of which latter is regulated by a screw e^7 , adjustable in a threaded opening in a plug e^8 , screwed into the air-reservoir. A binding-nut e^{8x} holds this screw at the point to which adjusted. Extending longitudinally through the neck e is a port e^9 , terminating in lateral branches e^{10} e^{12} , the ends of the former opening through the sides of the neck immediately adjacent to and back of the valve-disk e' , while the ends of the latter extend in opposite diametrical directions in the piston e^2 and open through the outer face thereof into the cylinder C, facing the piston d^2 . On the outer face of the piston e^2 is a central lug e^{13} in line with and designed to be engaged by the lug d^{13} of the piston d^2 . The connecting-neck e and the piston e^2 are encircled by spring packing-rings e^{14} .

F F' designate two air-pipes which are connected, respectively, to threaded openings $f f'$ of the cylinder and reservoir. At their outer ends these pipes open and extend into short angular pipe-sections f^2 , firm unions being made by stuffing-boxes f^3 . These pipe-sections are bolted or otherwise rigidly secured to the connecting portions of the inner and outer arms $b b'$. It will be noted that the connections of the pipes F F' with the pipe-sections are on an axial line with the pivot of the trolley-pole socket, whereby the movement of the latter does not in any way interfere with said connections, the tubular extension f^4 of each pipe being held as against leakage in the stuffing-boxes.

From the upper ends of the pipe-sections f^2 lead pipe extensions f^5 , which are united at their upper ends by a clamp f^6 to the trolley-pole at some convenient point intermediate its ends. To the terminals of these extensions f^5 are connected the upper ends of two flexible tubes f^7 and f^8 , which at their lower ends open into two stationary pipes f^9 f^{10} , extending from the car-roof at about the center of one side thereof. These latter pipes lead

to an air tank or reservoir (not shown) preferably located beneath the car and provided with suitable valves (also not shown) within convenient reach of the operator for controlling the admission and exhaust of air in the air cylinder and reservoir. The flexible connection between the stationary pipes f^9 f^{10} and the ends of pipes f^5 is such that it cannot be strained or in any way impaired by the swinging or moving of the trolley-pole.

In practice pressure is constantly maintained within the reservoir D, while the cylinder C is comparatively empty. Hence communication between the reservoir and cylinder is normally closed by the valve E, whose disk e' is held firm to its seat by its spring and air-pressure. When the trolley-wheel is in engagement with the trolley-wire, the roller b^2 of the depending portion of the socket a^3 is held normally but not necessarily against shoe d^4 of the piston-rod, and the latter's piston d^2 is normally within a short distance of the piston e^2 of valve E. In the event of the trolley-wheel flying or jumping off the wire the pole immediately assumes an approximately vertical or upright position under the action of the two springs. This forces rearward the piston d^2 , causing the lug d^{13} thereof to engage the lug e^{13} of the piston of valve E, driving the latter against the action of its spring and unseating the valve-disk e' , allowing the compressed air to pass through the port e^9 into cylinder C. This, by reason of the greater resistance of the piston d^2 , will cause the piston e^2 to travel rearward until contact is had with the seat e^4 . Then the piston d^2 will be forced forward by the expanding air-pressure, and the shoe on the piston-rod, engaging the lower end of the trolley-pole, will immediately turn the latter on its pivot and cause it to assume a horizontal or other position with the trolley-wheel lowered to a point beneath the trolley-wire. At this point of the operation the operator closes the valve (not shown) of pipe f^9 and opens the relief-valve (also not shown) of pipe f^{10} , leading to the cylinder C, allowing the air to escape therefrom and permitting of the reengagement of the trolley-wheel with the overhead wire, the pole being moved under the tension of its springs. As soon as pressure is thus released from the cylinder the valve E assumes its normal position and cuts off communication between the reservoir and said cylinder and the piston d^2 is free to move in its cylinder while the trolley-pole is being controlled by the operator in effecting the reengagement with the wire.

From what has been said it will be seen that almost immediately after the trolley-pole assumes a vertical or upright position air is automatically admitted to the air-cylinder, and, acting upon the piston therein, will cause the pole to be lowered to a horizontal position, or at some angle between the latter and an upright position, so that the trolley-wheel will be beneath the trolley-wire. It will also

be noted that my improved attachment in no way interferes with the movement of the trolley-pole or the swiveling of its base.

While I have shown and described the preferred form of embodiment of my invention, yet I do not restrict myself thereto, since changes may be made without departing from the scope of the invention.

I claim as my invention—

1. The combination with an electric-railway car having a pivoted overhead trolley-pole, of a pneumatic device for engaging said trolley-pole and automatically effecting the lowering of the outer end thereof in the event of the trolley-wheel jumping off the wire, as set forth.

2. The combination with an electric car, a pivoted overhead trolley-pole and springs acting on the latter, of a pneumatic device comprising a cylinder and piston having its rod designed to engage said pole and effect the movement thereof as against said springs when pressure is admitted to said cylinder, as set forth.

3. The combination with an electric car, a pivoted trolley-pole and springs acting on the latter, of a pneumatic device comprising a cylinder, means for admitting fluid-pressure therein, and a piston in said cylinder having its rod designed to engage said trolley-pole and effect the movement thereof as against said springs, said piston effecting the admission of said pressure into said cylinder when said trolley-pole leaves its normal position, substantially as set forth.

4. The combination with a car, a pivoted trolley-pole and springs acting thereon, of a pneumatic device comprising a cylinder, a piston movable therein having its rod designed to engage said trolley-pole and effect the movement thereof as against said springs, a reservoir communicating with said cylinder, and means for controlling said communication designed to be operated by said piston when said trolley-pole leaves its normal position, whereby said piston will be operated, as set forth.

5. The combination with a car, a pivoted trolley-pole and springs acting thereon, of a pneumatic device comprising a cylinder, a piston movable therein having its rod designed to engage said trolley-pole and effect the movement thereof as against said springs, a reservoir communicating with said cylinder, and a valve between said reservoir and cylinder designed to be operated by said piston when said trolley-pole leaves its normal position, whereby said piston will be operated, substantially as set forth.

6. The combination with a car, a pivoted trolley-pole and springs acting thereon, of a pneumatic device comprising a cylinder, a piston movable therein having its rod designed to engage said trolley-pole and effect the movement thereof as against said springs, a reservoir communicating with said cylinder, and a valve between said reservoir and cyl-

inder having a port therein which is normally closed, said valve being normally held to its seat and designed to be unseated by said piston when said trolley-pole leaves its normal position thereby establishing communication between said reservoir and cylinder and causing said piston to operate on said trolley-pole, substantially as set forth.

7. The combination with a car, a pivoted trolley-pole and springs acting thereon, of a pneumatic device comprising a cylinder, a piston movable therein having its rod designed to engage said trolley-pole and effect the movement thereof as against said springs, a reservoir communicating with said cylinder, and a valve between said reservoir and cylinder having a piston movable in said cylinder and a port extending through said piston, said port being closed when said valve is seated, said valve being designed to be unseated by said piston when the trolley-pole leaves its normal position, thereby admitting pressure from said reservoir to said cylinder and causing said piston to operate and effect the turning of said trolley-pole, as set forth.

8. The combination with an electric car, a pivoted trolley-pole and springs acting thereon, of a pneumatic device comprising a cylinder, a piston movable therein having its rod designed to engage said trolley-pole and effect the movement thereof as against said springs, a reservoir, a passage-way between said reservoir and cylinder, a valve having a neck movable in said passage-way, a piston on one end of said neck movable in said cylinder, a port extending through said valve-neck and piston and closed when said valve is seated, and a spring acting on said valve, substantially as set forth.

9. The combination with a car, a pivoted trolley-pole and springs acting thereon, of a pneumatic device comprising a cylinder, a piston movable therein having its rod designed to engage said trolley-pole and effect the movement thereof as against said springs, a reservoir, a passage-way between said reservoir and said cylinder, having valve-seats at its ends, a valve having a neck movable in said passage-way, a disk on one end of said neck, a spring for normally holding said disk against one of said seats, a piston on the other end of said neck movable in said cylinder, a port extending longitudinally through said neck and opening at one end through said neck adjacent to said disk and at its other end through said piston, substantially as set forth.

10. In a pneumatic device of the character herein described, the cylinder, the piston movable therein having a central lug, the reservoir communicating with said cylinder, the valve between said reservoir and cylinder having a port for establishing communication between the latter when said valve is unseated, the piston on said valve movable in said cylinder and having a central lug designed to be engaged by said lug of said for-

mer piston, and a spring acting on said valve, substantially as set forth.

11. The combination with the pivoted trolley-pole having a depending portion, and the base supporting said trolley-pole, of a pneumatic device connected to said base and having a cylinder, a piston, and a piston-rod designed to engage said depending portion of the pole, and guideways for said rod, substantially as set forth.

12. The combination with the pivoted trolley-pole having a depending portion, and the base supporting said trolley-pole, of a pneumatic device connected to said base and having a cylinder, a piston, the rod therefor, the shoe connected to said rod, and the guideways in said base for said shoe, whereby the latter is caused to engage said depending portion, substantially as set forth.

13. The combination with the pivoted trolley-pole having a depending portion, and the base supporting said trolley-pole, of a pneumatic device connected to said base and having a cylinder, a piston, the rod therefor, the shoe connected to said rod having side flanges, and the grooved guideways in said base for said flanges, substantially as set forth.

14. The combination with the base having uprights, of the trolley-pole, the socket therefor pivotally mounted between said uprights and having depending portions, springs connected thereto, a roller supported by said depending portions, and a pneumatic device having a piston the rod of which is normally in engagement with said roller, substantially as set forth.

15. The combination with the base having uprights, of the trolley-pole, the socket therefor pivotally mounted between said uprights and having depending inner and outer arms, parallel with said uprights, springs connected to said outer arms, a roller supported by said inner arms, a pneumatic device supported by said base and having a piston, and the rod therefor having a shoe normally in engagement with said roller, substantially as set forth.

16. The combination with a car, of a revoluble base, a trolley-pole having a socket supported by said base, springs for elevating said pole, and a pneumatic pressure device supported by said revoluble base and designed to act against said socket for lowering said trolley-pole, substantially as set forth.

17. The combination with a car, of a revoluble trolley-pole base mounted thereon, a trolley-pole pivotally mounted on said base, a pneumatic device for effecting the lowering of said trolley-pole, pipes leading from said device and articulated in line with the pivot of said pole having extensions secured to the latter, and flexible pipes leading from said extensions to the source of supply, substantially as set forth.

18. The combination with the car, of a revoluble trolley-pole base mounted thereon,

a trolley-pole, a socket therefor pivotally mounted on said base, a pneumatic device for effecting the lowering of said trolley-pole, pipes leading from said device and articulated in line with the pivot of said socket, extensions of said pipes secured to said pole, and flexible pipes leading from said extensions to the source of supply, substantially as set forth.

19. The combination with a car, a trolley-pole, a revoluble base therefor, and a pneumatic pressure device for controlling said pole mounted on said base, of fixed pipes extending from said car in line with said base and leading from the source of supply or point of control, and flexible connections between said fixed pipes and said pneumatic pressure device, substantially as set forth.

20. The combination with a car, of a trolley-pole base having uprights, a trolley-pole, a socket therefor pivotally mounted between said uprights and having depending portions, a pneumatic device having a movable portion designed to engage said depending portion, air-pipes leading from said device, pipe-sections attached to said depending portion, and to which said air-pipes are connected on an axial line with the pivot of said socket, pipe extensions leading from said pipe-sections and connected at their outer ends to said pole, flexible pipe connections between said pipe extensions, and stationary pipes of the car leading from the source of supply and to which said flexible connections are attached, substantially as set forth.

21. The combination with a car, of a trolley-pole base having uprights, a pole, a socket therefor pivoted between said uprights and having inner and outer arms, springs attached to said outer arms, a cylinder attached to said base, a piston therein, a rod therefor, a shoe on the end of said rod movable between said uprights, a reservoir having a passage-way leading into said cylinder, a valve in said passage-way having a port, a spring acting on said valve for normally holding said port closed, a piston on said valve movable in said cylinder, both of said pistons having opposite lugs, pipes opening into said reservoir and cylinder, pipe-sections attached to said outer arms and to which said pipes are connected in axial line with the pivot of said socket, extensions leading from said pipe-sections, a clamp for attaching the outer ends of said extensions to said pole, flexible tubes leading from the ends of said extensions, and stationary pipes extending above the car-roof on line with said trolley-pole base to which said tubes are connected, substantially as set forth.

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

HARLAN P. WELLMAN.

Witnesses:

S. N. DAVIS,

M. T. NEWMAN.