

UNITED STATES PATENT OFFICE.

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ELECTRIC-RAILWAY CAR.

SPECIFICATION forming part of Letters Patent No. 558,870, dated April 21, 1896.

Application filed November 5, 1895. Serial No. 568,029. (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 relates to certain new and useful improvements in electric-railway cars, and has special reference to means for effecting the automatic lowering of the trolley-pole in the event of the trolley-wheel jumping the wire, whereby the lowering of said pole may be accomplished without the operator leaving the car.

The present invention bears close analogy to that shown and described in my pending application for patent filed October 1, 1895, Serial No. 564,314, but possesses different features, having advantages over the means therein described for accomplishing the above-stated result.

One of the objects of this invention is to provide improved connections or passage-ways for the fluid-pressure and avoid extending the supply-pipes over the roof of the car and connecting them to the trolley-pole. This I accomplish by providing the pivoted base on which the trolley-pole is swiveled with a depending tubular or cylindrical portion in which are two passage-ways for the pressure fluid, said passage-ways being connected, respectively, direct to the air-reservoir and air-cylinder carried by said base. The rod of the piston in the air-cylinder is connected direct to two depending links pivoted to the trolley-pole socket on the same axial line as the latter, and a central depending portion of said socket is designed to engage said links when the trolley-wheel jumps the wire, causing the piston to unseat the valves controlling the passages from the air-reservoir to the air-cylinder.

The present invention also embraces certain improvements in the communications between the air reservoir and cylinder and also in the valve therefor.

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 socket and its base with my improvements. Fig. 2 is a vertical longitudinal sectional view thereof. Fig. 3 is an enlarged vertical sectional view of a portion of the air reservoir and cylinder, parts being broken away. Fig. 4 is an end view of Fig. 2 with parts in vertical section. Fig. 5 is an enlarged vertical sectional view of the base. Fig. 6 is a horizontal sectional view on line 6 6, Fig. 5, with parts broken away. Fig. 7 shows details.

Referring to the drawings, A designates a portion of a car-roof; *a*, a trolley-pole base provided with teeth *a'* around its periphery whereby said base can be turned or swiveled by any suitable means—as, for instance, by a pneumatically-operated rack-bar—such as is shown and described in my pending application for patent filed September 17, 1895, Serial No. 562,766. From this base depends a cylindrical portion *a²* of suitable diameter to form the pivot for the base, and this is elongated into a narrower portion *a³*. Within the bore or passage-way *a⁴* of these cylindrical portions is located a tube *a⁵*, forming a second passage-way. At its lower end this tube is secured to a stuffing-box *a⁶*, into which opens a supply-pipe *a⁷*, while at its upper end said tube is screwed into a central threaded opening *a⁸* of the base, from which opening leads a lateral bore or passage-way *b*, opening at its outer end through the top of the base.

From the upper end of the bore or passage-way *a⁴* leads a second lateral bore or passage-way *b'*, which also terminates in an opening in the top of the base. An oil-cup *a⁹* on extension *a³* catches any waste oil dripping from the inclosed portion *a²*. In this extension *a³* is formed a series of holes or openings *a¹⁰*, which are surrounded and inclosed by a T-coupling *a¹²*, into which opens a pipe *a¹³*. Suitable stuffing-boxes *a¹⁴* inclose the ends of this coupling. From the base *a* project two parallel uprights *b²*, which support the pivot-rod *b³* of the trolley-pole socket B. A central depending portion *b⁴* of this socket is movable

between these uprights, while parallel with the latter, on the outside thereof, are two depending arms b^5 , having curved extensions b^6 , provided with teeth b^7 . From the sides of the central portion b^4 project hollow lugs b^8 , upon which are pivoted depending corresponding links C, which at their lower ends are united by a cross-rod d . These links are designed to be engaged and forced rearward by the central depending portions b^4 of the trolley-pole socket when the trolley-wheel flies off the wire.

D is a compressed-air cylinder, which extends from the uprights b^3 and is open at one end. To the outer end of said cylinder is connected an air-reservoir E, which communicates with the cylinder D through the passage-way d of a hollow connecting-neck d' , and also through two ports d^2 d^3 , leading into a common port d^4 , opening into said cylinder. Within cylinder D is a piston d^5 , whose rod d^6 is connected direct to the cross-rod d of links C. The trolley-pole is constantly under the tension of two coil-springs d^7 , which at one end are held by adjustable screws d^8 , working in lugs d^9 on the exterior of cylinder D, while to their other ends are connected sprocket-chains d^{10} , united to the ends of arms b^5 of the trolley-pole socket in such manner as to be engaged by the teeth b^7 of the extensions b^6 when the pole is lowered. A pipe b^{12} leads from the bore or passage-way b to and opens in the air-reservoir E, while a pipe b^{13} leads from bore or passage-way b' to the air-cylinder D, into which it opens at b^{14} .

F F' designate two valves for controlling the admission of air from the reservoir to the air-cylinder, the former controlling passage-way d and port d^2 and the latter port d^3 . The valve F comprises a cylindrical rod or neck f , having a reduced portion f' within the enlarged end of passage-way d , a valve-disk f^2 on one end of said rod located in the reservoir, and a piston f^3 on the other end within the cylinder. The valve F' is a slide-valve, and has two bearing-faces f^4 , which are normally located over two end branches of port d^3 . It is recessed at its ends to accommodate, respectively, a projection of valve F and the lug of a plate f^5 , against which bears a coil-spring f^6 , inserted through a plug-closed opening at f^7 . This spring serves to normally hold the valves F and F' seated, so as to close their respective ports. The rod or neck f is slightly reduced in diameter a portion of its length, as at f' , so as to permit air from the reservoir to pass to the port d^2 when the disk f^2 is unseated. When this occurs, valve F' is also unseated by reason of direct engagement therewith of the valve F, thus also allowing passage of air through port d^3 . On the outer face of piston f^3 is a central lug f^8 , in line with and designed to be engaged by a lug f^9 of piston d^5 .

In practice pressure is constantly maintained in the air-reservoir, the air being sup-

plied through the pipe b^{12} , leading from the lateral port b in the base; but pressure is only admitted through pipe b^{13} to the air-cylinder when the operator desires to effect the lowering of the trolley-pole. The main office of this pipe b^{13} and its communicating passage-way a^4 and pipe a^{13} is to relieve pressure from the cylinder when the device has been automatically operated after the trolley-pole has been lowered subsequent to the trolley-wheel accidentally jumping off the wire. When the trolley-wheel is in engagement with the trolley-wire, the central depending portion of the pole-socket is held away from the links to which the end of the piston-rod d^6 is connected, as shown in Fig. 2, and the piston d^5 is normally within a short distance of the piston f^3 of valve F. If the trolley-wheel jumps the wire, the pole, under the action of its springs, immediately swings upward at its outer end, and the depending portion b^4 of the pole-socket striking against the links C will force rearward the piston d^5 , causing lugs f^8 f^9 of the two pistons to strike, moving the piston f^3 rearward and unseating valve-disk f^2 and valve F', as against the action of the spring f^6 . This allows air to pass from the reservoir through ports d^2 , d^3 , and d^4 into the cylinder between the two pistons therein. The piston d^5 will be forced forward by the expanding air-pressure, and the links pushing against the depending portion of the pole-socket will cause the latter to turn on its pivot until the pole assumes a horizontal or other position with its wheel lowered beneath the trolley-wire. The pole then being under the control of the operator, by any suitable means whereby it can be readily made to reengage the trolley-wire, the operator closes the valve (not shown) of the pipe a^7 , cutting off supply to the reservoir, and opens the relief-valve (also not shown) of pipe a^{13} , allowing air to escape from the cylinder. As soon as pressure is thus released, the valves F and F' assume their normal positions under the action of the springs f^6 . The two pipes a^7 and a^{13} are provided with flexible portions g to permit of the base and its depending portion being turned without injury to the pipe connections. By means of the sprocket-teeth b^7 engaging-chains d^{10} lateral play of the latter is prevented.

The advantages of the present invention are manifest. All the connections between the pneumatic pressure device and their pipes are beneath, or about on a line with the car-roof, avoiding all upper extensions, and the base is free to be turned when the position of the trolley-pole is to be changed.

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, of a revoluble trolley-pole base, a

trolley-pole mounted thereon, a pneumatic pressure device carried by said base for automatically moving said pole, and pipe connections opening into said device and leading through said base, as set forth.

2. The combination with an electric-railway car, of a revoluble trolley-pole base having passage-ways therein, a pneumatic pressure device carried by said base for automatically moving said pole, and pipe connections opening into said device and leading from said passage-ways in said base, as set forth.

3. The combination with an electric-railway car, of a revoluble trolley-pole base having a depending cylindrical portion provided with ports or passage-ways, a trolley-pole mounted on said base, a pneumatic pressure device carried by said base for automatically moving said pole, pipes leading from said device to said ports or passage-ways, and a second set of pipes opening into said ports or passage-ways, substantially as set forth.

4. The combination with an electric-railway car, of a revoluble trolley-pole base having a depending cylindrical portion and upper lateral ports, one of which communicates with said cylindrical portion, a tube or pipe in the latter opening into the other one of said lateral ports, supply-pipes communicating, respectively, with said cylindrical portion and said tube or pipe, a trolley-pole, a pneumatic pressure device carried by said base for moving said pole, and pipes leading from said lateral ports and opening into said pneumatic pressure device, substantially as set forth.

5. The combination with an electric-railway car, of a revoluble trolley-pole base having a depending cylindrical portion provided with holes therein, and upper lateral ports in said base, one of which communicates with the bore of said cylindrical portion, a tube or pipe in the latter opening into the other one of said lateral ports, a supply-pipe opening into said tube or pipe, a second supply-pipe coupled to said cylindrical portion around said holes therein, a trolley-pole mounted on said base, a pneumatic pressure device carried by said base and designed to automatically operate on said pole, and pipes leading from said lateral ports and opening into said device, substantially as set forth.

6. The combination with the base, of the trolley-pole, the socket therefor pivotally mounted on said base and having depending arms provided with toothed curved portions, the springs, the chains connected thereto and to said arms designed to be engaged by said toothed curved portions, and a pneumatic pressure device for effecting the turning of said trolley-pole on its pivot, substantially as set forth.

7. The combination, with the base, of the trolley-pole, the socket therefor pivotally mounted on said base and having a depending portion, springs connected to said socket, and a pneumatic pressure device mounted on

said base having a piston, and depending links pivoted at their upper ends on the same axial line with the pivot of said socket, and to the lower ends of which the rod of said piston is connected, substantially as set forth.

8. The combination with the base having uprights, of the trolley-pole, the socket therefor having a central depending portion and outer arms, a pivot-rod for said socket supported by said uprights, springs connected to said arms, depending links pivoted at their upper ends on line with the pivot of said socket, and a pneumatic pressure device having a piston the rod of which is connected to the lower ends of said links, substantially as set forth.

9. The combination with the base having uprights, of the trolley-pole, the socket therefor having a central depending portion and outer arms, said depending portion having hollow lugs, a pivot-rod passed through said lugs and supported by said uprights, springs connected to said arms, links depending from said lugs and connected at their lower ends, and a pneumatic pressure device having a piston the rod of which is connected to the lower ends of said links, substantially as set forth.

10. The combination with a car, a pivoted trolley-pole, and springs acting thereon, of a pneumatic pressure device, comprising a cylinder, a piston moving therein having its rod designed to engage the socket of said trolley-pole and effect the movement thereof as against said springs, a reservoir, ports leading therefrom into said cylinder, and valves in said reservoir normally closing said ports and designed to be unseated by said piston when said trolley-pole leaves its normal position, thereby establishing communication between said reservoir and cylinder causing said piston to operate on said trolley-pole socket, substantially as set forth.

11. The combination with a car, a trolley-pole, a pivoted socket therefor, and springs acting thereon, of a pneumatic device, comprising a cylinder, a piston movable therein having its rod designed to engage a portion of said socket and effect the movement thereof as against said springs, a reservoir having ports leading into said cylinder, valves normally closing said ports, one of said valves having a piston located in said cylinder, and a spring for normally holding said valves over said ports, substantially as set forth.

12. The combination with a car, a trolley-pole, a pivoted socket having a depending portion, and springs connected to said socket, of a pneumatic device comprising a cylinder, a piston movable therein having its rod designed to engage said depending portion of said socket and effect the movement thereof and of said pole as against said springs, a reservoir, a port leading from said neck, a second port leading from said reservoir, both of said ports opening into a common port leading into said cylinder, valves designed to nor-

5 mally close said ports, one of said valves having a rod located in said hollow neck, a piston on said rod within said cylinder, said valve engaging the other one of said valves, and the springs bearing against said latter valve, substantially as set forth.

10 13. The combination with a car, of a revolvable trolley-pole base having a depending cylindrical portion and two uprights, a trolley-pole, a socket therefor, pivotally mounted between said uprights and having hollow lugs through which the pivot-rod is passed, said socket also having a central depending portion and outer arms, springs connected to said arms, links depending from said hollow lugs and connected at their lower ends, a pneumatic pressure device carried by said base comprising a cylinder, a piston movable therein having its rod connected at its outer end to said links, a reservoir communicating with said cylinder and a valve or valves for controlling the passage from said reservoir to said cylinder designed to be unseated by said piston when said trolley-pole leaves its normal position, whereby said piston will be operated, substantially as set forth.

15 14. The combination with a car, of a revolvable trolley-pole base having a depending cylindrical portion provided with two ports or passage-ways, and upper lateral ports, lower supply-pipes opening into said ports or passage-ways in said cylindrical portion, uprights

extending from said base, a trolley-pole, a socket therefor having a central depending portion provided with hollow lugs and outer 35 depending arms, the pivot-rod, the springs connected to said arms, the links depending from said hollow lugs and connected at their lower ends, the pneumatic pressure device comprising a cylinder, a piston movable therein having its rod connected to the lower ends of said links, said piston, having a central lug on its inner face, a reservoir having a hollow neck opening into said cylinder, and also having two sets of ports leading therefrom 45 into said cylinder, a slide-valve normally closing one of said sets of ports, a spring bearing against said slide-valve, a second valve closing the other one of said sets of ports, having a rod extended through said hollow neck provided with a reduced portion, a piston on said rod movable in said cylinder having a central lug in line with the lug of said former piston, and pipes leading from said reservoir and cylinders and opening into said lateral ports of 55 said base, substantially as set forth.

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

HARLAN P. WELLMAN.

Witnesses:

C. W. MEANS,

W. C. RICHARDSON.