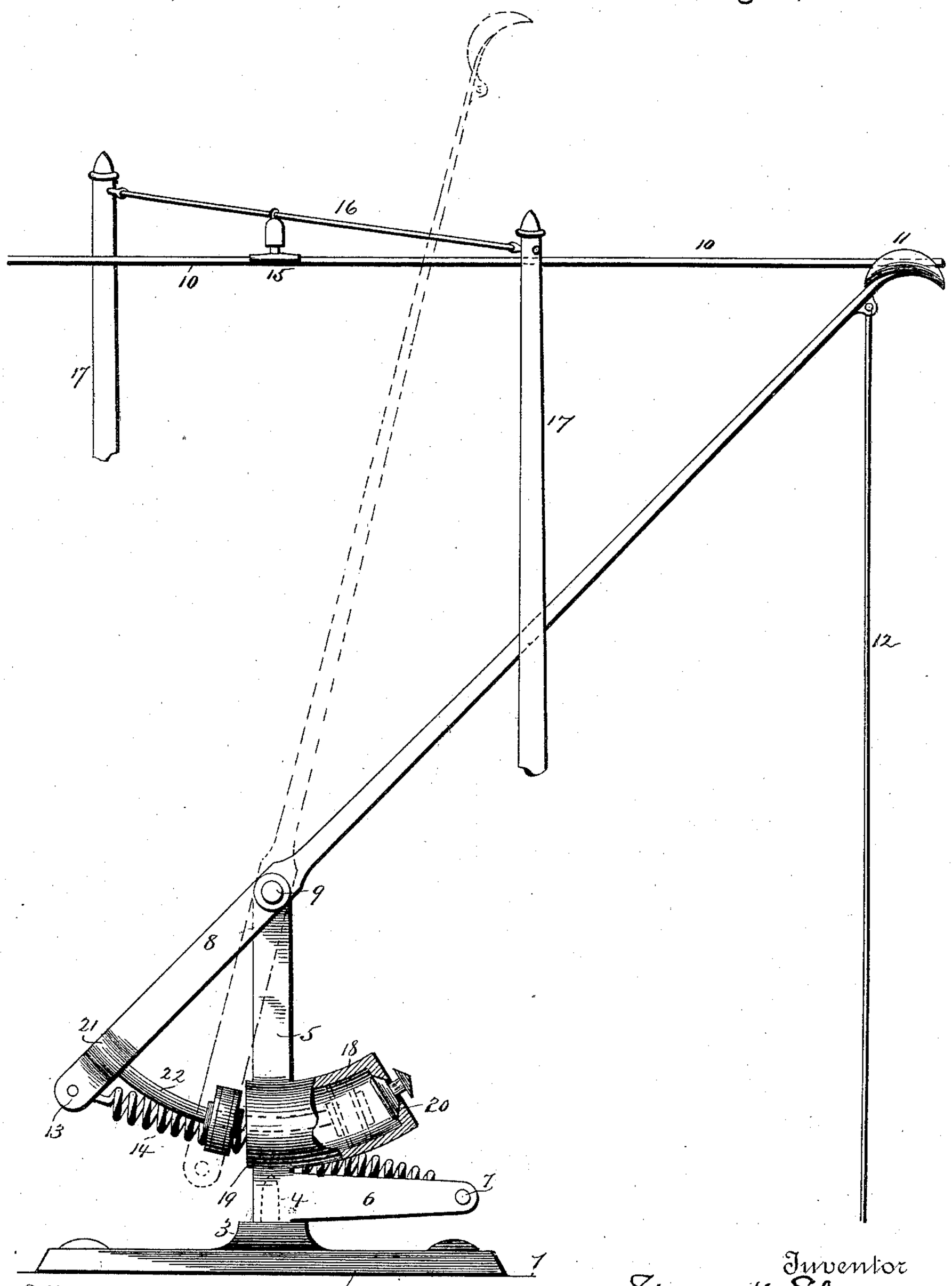
(No Model.)

S. H. SHORT.

TROLLEY FOR ELECTRIC RAILWAYS.

No. 457,015. Patented Aug. 4, 1891.



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UNITED STATES PATENT OFFICE.

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TROLLEY FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 457,015, dated August 4, 1891.

Application filed March 29, 1890. Serial No. 345,867. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY H. SHORT, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Trolleys for Electric Railways; 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.

My invention has reference to improvements in trolleys for electric railways in which an overhead conductor arranged parallel to and extending along the line of travel is employed. In such railways there is arranged on the motor-car, ordinarily upon the roof of the same, a long lever, capable of swinging in a vertical plane, the upper end of which carries a contact roller or brush or shoe, which bears upon the under side of the line conductor, and a spring or springs, acting upon the short arm of this lever, tends to hold the contact device mounted at the end of the long arm in firm contact with the line conductor. The line conductor itself is ordinarily stretched between insulators suspended from span-wires, which cross the line of travel at right angles and are supported above the line conductor by poles mounted on each side of the road. It often happens that the contact devices, whether they are rollers, brushes, or shoes, leave the line conductor and the trolley-lever, to which they are secured, impelled by the actuating-spring, is suddenly swung upward and rises to a vertical position with its free end above the span-wires. If this happen, the trolley-arm carried by the rapidly-moving car strikes a hard blow to the span-wire, and either the latter or the trolley-arm itself breaks, causing great trouble and delay in the car-services; and it is the object of my invention to overcome this difficulty by the arrangement of devices for preventing the trolley-arm either from rising above the span-wires, or, if allowed to rise a short distance above the same, to be arrested in an inclined position, from which it will be gently depressed by the span-wires without injury either to the latter or the trolley-arm itself. This result I accomplish by the use of an elastic buffer—such as a dash-pot—arranged to render the upward movement of the trolley-arm beyond the line-wire very slow, and to arrest such movement either below the span-wire or before the trolley-arm has risen at a dangerous inclination above the same, all of which will more fully appear from the following detailed description, with reference to the accompanying drawing, which forms a part of this specification, and in which I have illustrated a side elevation of my improved trolley in operative relation to an overhead line conductor and span-wire.

To the roof 1 of an electric motor-car is secured a base-plate 2, from the center of which rises a block 3, and upon a vertical swivel-pin projecting from the same, as indicated in dotted lines at 4, is pivoted a standard 5, from the lower end of which extends the horizontal arm 6, carrying a pin 7 at its free end. The trolley-arm 8 is a lever pivoted to the upper end of the standard 5 at 9, so as to be capable of swinging in a vertical plane. The long arm of the trolley-lever extends upwardly toward the line conductor 10 and carries at its upper end a contact wheel, shoe, or brush 11, bearing upon the line conductor, and a rope or chain 12 extends from the trolley-lever down to the car, by means of which the lever may be pulled down when the trolley must be reversed for a return trip. The short arm of the trolley-lever has secured at its free end by a pin 13 a helical spring 14, the other end of which is secured to the pin 7 on the horizontal arm 6, which extends from the standard 5. The tendency of this spring is to pull the short arm of the trolley-lever downwardly, thereby raising the long arm of the lever and effecting good contact between the wheel, shoe, or brush 11 with the line conductor. The line conductor 10 is stretched between insulators 15, one of which only is shown in the drawing, and each insulator is suspended from a span-wire 16, supported above the line conductor by posts 17 17 and crossing the same ordinarily at right angles.

The construction so far described is substantially like that now ordinarily employed, and it will be seen that if by accident, as frequently happens, the contact 11 should leave the line conductor, the trolley-lever 8 would

be thrown up to a vertical position, or very nearly so, and would thus be elevated above the line of the span-wire 16, and if the car is at that time running the trolley-arm will strike the span-wire a heavy blow and either one or the other will be destroyed or severely injured. To avoid this danger I employ the following arrangement: To the post 5 is secured a hollow vessel 18, the same being in effect a cylinder, the axis of which is the arc of a circle described about the pivot-point 9 as a center. This curved cylinder is open at one end 19, and is closed at the other end, and is there provided with a valve 20, opening interiorly. This valve may be of any description—such, for instance, as an ordinary flat valve of leather or soft rubber. To the short arm of the trolley-lever 8, near the end thereof, is secured at a point 21 a rod 22, which is also curved upon the arc of a circle described about the pivotal point 9 as a center, and to the free end of this rod is secured a piston 23, which snugly fits, but without perceptible friction, the interior of the curved cylinder 18, and the length of the piston-rod 22 is such that when the trolley-arm is in such position that the contact wheel or brush 11 bears upon the line conductor the forward end of the piston is about to enter into the cylinder 18. It will now be seen that when the contact 11 comes to a portion of the line-wire more elevated than the rest, as frequently happens, the spring 14, acting upon the short arm of the trolley-lever, will elevate the long arm of said lever and thus maintain the contact, and during this operation the piston will fairly enter into the cylinder and slightly compress the air confined therein. The slight movement required for maintaining the contact does, however, not compress the air within the cylinder to any considerable extent, so that the upward movement of the long arm of the trolley-lever for a short distance is not perceptibly impeded by the cylinder and piston, which together constitute what is known in the art as a "dash-pot." The automatic adjustment of the contact to the slightly-varying elevations of the line-wire is therefore quite prompt, it being understood that the downward movement of the long trolley-arm is effected with ease, since the inwardly-opening valve 20 keeps the air-pressure on both sides of the piston about uniform. If, however, the contact 11 should automatically leave the line conductor, the trolley-arm will be forced up toward the position indicated in dotted lines by the spring 14; but by reason of the considerable compression of the air in the dash-pot which now takes place, this upward movement will be very gentle, and will be so limited that the trolley-arm will barely, if at all, rise above the line of the span-wire, and if it should rise above the same it will still be inclined at such angle that when it strikes the span-wire it will, by the movement of the car, be gradually forced down without injury either to itself or to the span-wire. From its elevated position above the line conductor the trolley-arm can at all times be pulled down with ease by means of the rope or chain 12, since, as has been stated above, the valve 20 of the dash-pot opens inwardly.

It will be clear that I am not confined to the use of a dash-pot constructed and arranged precisely in the manner shown and described, since an elastic buffer of any other description may be substituted therefor; nor am I confined to any other specific detail of construction, since all this may be varied considerably without in any way or manner deviating from the fundamental idea of my invention.

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

1. In a trolley for electric railways, the combination of a spring-actuated lever carrying rollers or brushes into contact with an overhead line conductor, with a dash-pot connected with the lever for checking and limiting the upward movement of the latter, substantially as described.

2. In a trolley for electric railways having an overhead line conductor, the combination of a spring-actuated contact-lever for carrying current from the conductor to the motor, with a dash-pot connected with the short arm of the lever, timed, as described, for checking the upward movement of the long contact-arm and limiting the same below the span-wires of the line conductors, substantially as described.

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

SIDNEY H. SHORT.

Witnesses
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JOHN C. DOLPH.