(No Model.)

H. A. SEYMOUR.

SYSTEM OF ELECTRIC LOCOMOTION.

No. 384,594. Patented June 12, 1888.

Fig. 1.

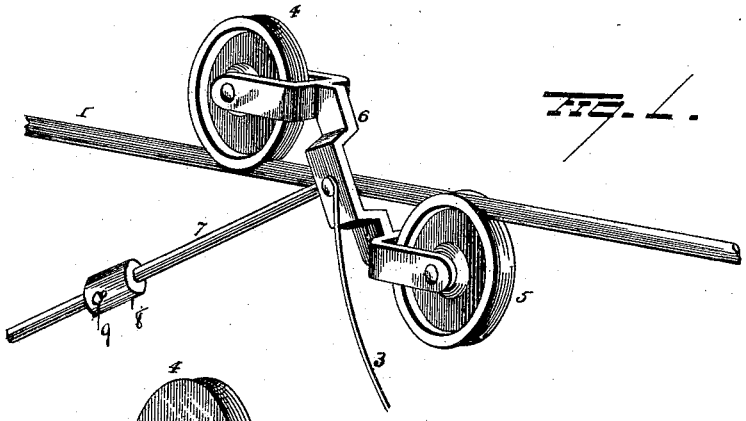


Fig. 2.

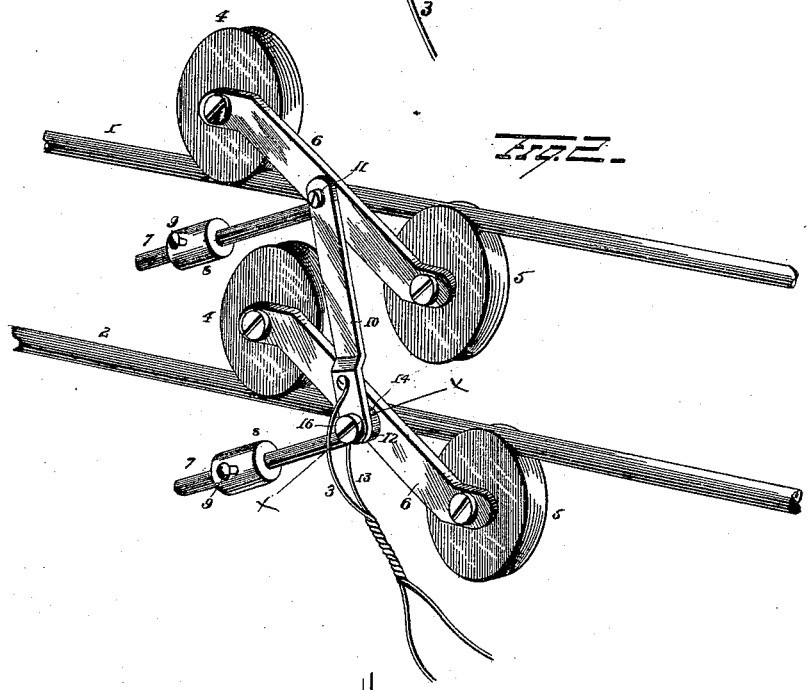
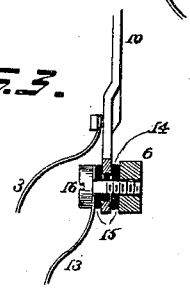


Fig. 3.



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UNITED STATES PATENT OFFICE.

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SYSTEM OF ELECTRIC LOCOMOTION.

SPECIFICATION forming part of Letters Patent No. 384,594, dated June 12, 1888.

Application filed June 7, 1887. Serial No. 240,538. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. SEYMOUR, of Washington, District of Columbia, have invented certain new and useful Improvements in System of Electric Locomotion; 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.

In systems of electric locomotion in which the current is supplied to the traveling motor by a line or lines of aerial overhead conductors arranged along the track, there is ordinarily provided a contact-roller, or a truck of such rollers, mounted upon the line conductor or conductors, and a flexible connection from the rollers is carried down to the car, where it is properly connected with the propelling electric motor, which is suitably geared to the wheels of the vehicle. As the car travels upon the rails the contact-rollers are dragged along by the same over the line-conductors, and it is intended that the contact between the rollers and the line-conductors be continuously maintained, and that a derailment of the rollers be prevented. Hitherto it has been difficult, and in fact impossible, to satisfy these conditions, and the defects in the operation of electric railway systems of this character, resulting from defective contact of the rollers, are very numerous and aggravating, as will be clear to those skilled in the art. Of the numerous causes of defective and of discontinuous electrical contact may be mentioned the oxidation of the necessarily exposed line-conductor, the hopping motion of the rollers, and the accumulation of snow upon the lines. Upon an extended line exposed to the weather, spots of rust soon form upon the upper surface of the same, and as often as a contact-roller passes over such spot the circuit is practically interrupted, the motor deprived of current, and a destructive spark passes between the roller and the conductor. After having passed the insulating spot the roller suddenly makes contact again with the line, and the motor receives at once again the whole current. By the sudden influx of the whole current the motor system receives an injurious shock, which it is desirable to avoid. The same effect is produced by the hopping motion of the contact-rollers, which has also the additional disadvantage of wearing both the line-conductor and the contact-rollers to such degree as to render the maintenance of the system very expensive. The accumulation of snow upon the upper surface of the conductor effectually prevents electrical contact between it and the rollers, all of which will be well understood by those skilled in the art.

It is the object of my invention to overcome the difficulties here enumerated, and I achieve this object by constructing a truck of contact-rollers which, when placed upon the aerial conductor, will cause the rollers to grasp the conductor between them, so as to establish and maintain contact on two opposite surfaces of the conductor, and the arrangement is such that any tendency of the truck to leave the wire or conductor on one side will operate to press it with increased force against the other side of the conductor. In addition to this, contact with the line-conductor is maintained at two points, a suitable distance apart from each other, so that if by the presence of rust upon the conductor, or for any other reason, there should be an insulating spot at one point in the line, electrical contact will be supplied at another point in the line.

In the accompanying drawings, which form a part of this specification, I have shown two forms which my invention may assume; but it will be understood that I do not propose to limit myself to these specific constructions, since the same may be widely varied in matters of detail without departing from the spirit of my invention.

In the drawings, Figure 1 represents a perspective view of an electrical contact-truck, mounted upon a single aerial line-conductor; Fig. 2, a similar view of two trucks joined together, and each mounted upon a separate line-conductor; and Fig. 3, a sectional view of a detail of construction on line *x x*, Fig. 2.

Referring now more particularly to Fig. 1, there is shown a line-conductor, 1, which extends along and parallel with the track of an electric railway. This line-conductor may be supposed to be grounded at one or both ends, and is charged by a generator or generators at

a station, or at several stations. If the line is grounded at one end only, the flexible conductor 3, in electrical connection with the line, as will presently appear, carried down to the grounded motor upon a car on the track, places said motor in the main circuit. If the line is grounded at both ends, the motor is placed in a branch from the main circuit. The connection of the flexible conductor 3 with the line is established and maintained by two grooved rollers, 4 5, mounted in a frame, 6. Said frame 6 is shown in Fig. 1, bifurcated at each end, and a roller journaled in each of the slots thus formed. If this construction is adopted, the frame must be bent in the middle to clear the line-bar, as shown; but this construction is not absolutely necessary, since the rollers may be journaled on the same side of the frame, which in that case is left plain, and will clear the line without being bent around the same, as is shown in Fig. 2.

From the middle of the frame 6 projects a rod, 7, parallel to the plane of the two rollers, but at an angle to the line which connects the centers of these rollers. A weight, 8, is placed adjustably upon rod 7, and is clamped in position by clamp-screw 9. This structure is so placed upon the line-wire that the groove in roller 4 engages the upper surface of the line-conductor, while the groove in roller 5 engages the lower surface of the same. It will be now understood that a truck thus placed upon the line-wire will be pressed in contact with the same by both of its rollers by the action of the weight 8, which tends to turn the frame about its middle, whereby the roller 4 is caused to press downwardly upon the line-conductor, while roller 5 is pressed upwardly against the same. In order that this may be done effectively, the weight 8 must be more than sufficient to overcome the weight of both the frame and of the lower roller, 5, and the amount of pressure can be adjusted by sliding weight 8 to different positions upon rod 7. From the middle point of frame 6 the flexible conductor 3 extends down to the motor upon the car, and by this conductor the contact-truck is dragged along upon the line-wire as the car travels upon the track.

It will now be understood that in this arrangement of contact-rollers insulating spots upon the line-conductor cannot interrupt the circuit, for if one of the rollers should, by reason of such insulating spot, fail to make good electrical contact, the other roller, moving at the same time over another part of the line-conductor, will supply that contact. It is also clear that the truck thus mounted cannot possibly jump out of contact with the conductor, for a vertical upward movement of the truck will only cause increased pressure of the lower roller upon the line-wire. Nor is a derailment of the truck likely to occur, since it securely embraces the line-wire, and any tendency to a lateral motion which may exist is guarded against by the flange of the grooved rollers.

In Fig. 2 I have shown a system in which two line-conductors—one vertically above the other—are employed. One of these conductors serves as a return for the other. In this system there are necessarily two pairs of contact-rollers, one pair upon each line-conductor, and the two are connected by a link, 10, pivoted at 11 and 12, at the middle of the two frames, 6 6. The length of this link 10 is greater than the vertical distance between the two line-conductors, so that one of the trucks will be slightly ahead of the other, as shown in the drawings. One flexible conductor, 3, is directly connected with link 10 by any suitable means, as shown, and the other flexible conductor, 13, is in electrical connection with the lower truck, which is insulated from link 10, as shown more particularly in Fig. 3.

There it may be seen that a bushing, 14, of insulating material, is inserted into a hole at the lower end of link 10, and two washers, 15, of like material, are placed on each side of the link, while a screw, 16, passing through the washers, the bushing, and into frame 6, securely connects the link to the lower frame, 6, while the two are well insulated from each other. The flexible conductor 13 may be clamped between the screw-head and one of the washers 15, or it may be directly connected with the lower frame, 6, by any suitable means. The operation of this double-contact truck is identical with that shown in Fig. 1. The same advantages result from both. The insulation of the two trucks from each may be effected by other means than those shown, and I do not limit myself to the identical construction here shown; nor do I limit myself to the use of my improved contact-truck in connection with overhead line-conductors, since they are applicable for use in connection with other ground-conductors, which are usually laid in a ditch or channel in the middle of the road-bed. In this case, the flexible conductor or conductors pass through a slot in the road-bed down into the channel, as is well understood by those skilled in the art.

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

1. In an electric railway system, the combination, with a line-conductor, of a rigid frame, contact-rollers journaled on said frame and bearing upon opposite sides of the line-conductor, and a single weight carried by the frame and adapted to hold both rollers in contact with the line-conductor, substantially as set forth.

2. In an electric railway system, the combination, with a line-conductor, of a frame carrying at one end a roller adapted to rest against one side of the line-conductor and at its opposite end a roller to rest against the opposite side of the line-conductor, and a weight attached to said frame for turning said frame to establish and maintain contact of the rollers with the line-conductor, substantially as set forth.

3. A contact-truck composed of grooved rollers engaging the opposite sides of the line-conductor, a frame for supporting said rollers, and a weight tending to turn said frame about its middle, and the rollers in contact with the conductors, substantially as described.

4. An electrical contact-truck composed of a frame, rollers mounted thereon and engaging opposite sides of a line-conductor, and an adjustable weight tending to turn said frame about its middle, substantially as described.

5. In an electric railway system, two line-conductors parallel to each other and one vertically above the other, in combination with a contact-truck for each conductor, a device tending to hold the contact-points of each truck in contact with its respective conductor, a link loosely connecting the two trucks mechanically, but insulated from one of them electrically, and flexible conductors extending from the trucks to a traveling motor, substantially as set forth.

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

HENRY A. SEYMOUR.

Witnesses:
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S. G. NOTTINGHAM.