

(No Model.)

M. CATTORI.
ELECTRIC RAILWAY.

No. 492,659.

Patented Feb. 28, 1893.

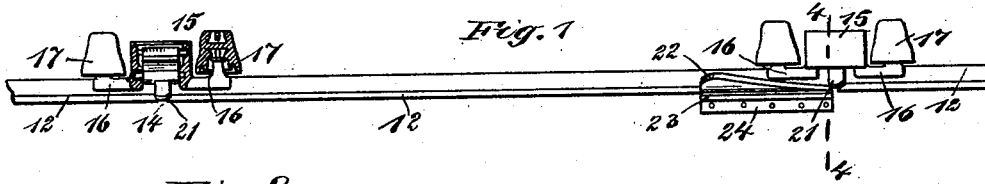


Fig. 2.

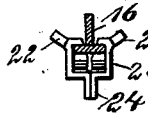


Fig. 3

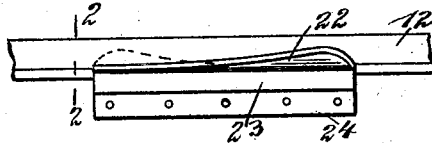


Fig. 4.

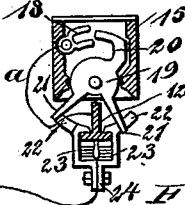


Fig. 5



Fig. 7.

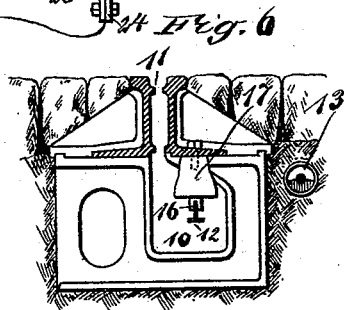
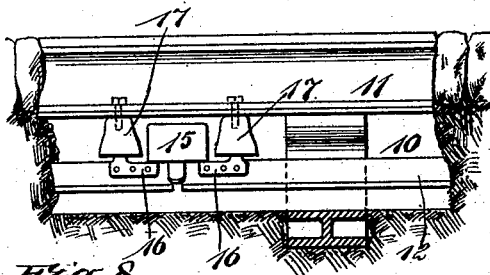


Fig. 8

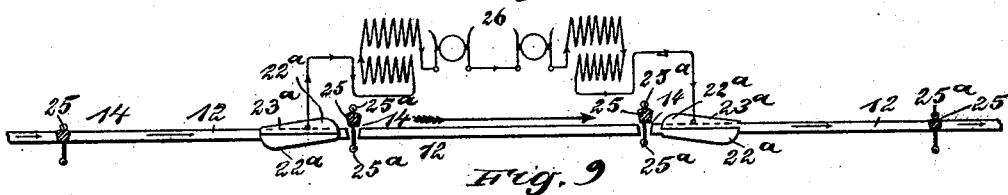
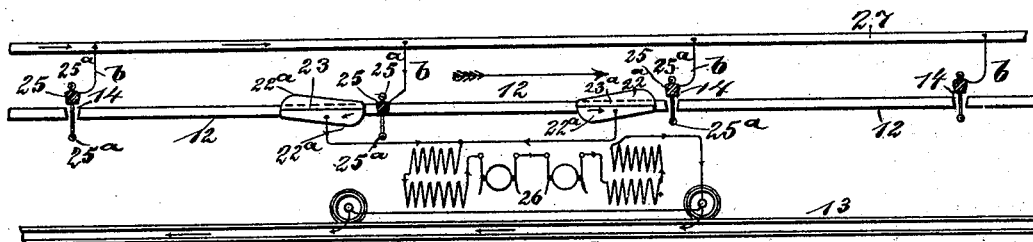


Fig. 9



WITNESSES:

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MICHELANGELO CATTORI, OF ROME, ITALY.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 492,659, dated February 28, 1893.

Application filed July 23, 1892. Serial No. 440,975. (No model.) Patented in Italy December 21, 1891, No. 30,954; in Belgium March 26, 1892, No. 98,987, and in England March 29, 1892, No. 6,119.

To all whom it may concern:

Be it known that I, MICHELANGELO CATTORI, a subject of the King of Italy, and residing at Rome, Italy, have invented a new and Improved Electric Railway, (for which I have obtained Letters Patent in Italy, No. 30,954, dated December 21, 1891; in Great Britain, No. 6,119, dated March 29, 1892; and in Belgium, No. 98,987, dated March 26, 1892,) of which the following is a full, clear, and exact description.

My invention relates to improvements in that class of electric railways in which a conductor is divided into sections, and a series of circuit breakers are arranged to connect the several sections and operated by moving contacts carried by a car.

My invention relates principally to the circuit breakers and the means of operating them, and the object of the invention is to produce a simple railway which may be economically operated, and in which the circuit breakers and their operating contacts are constructed so as to work easily, be durable, and operate without sparking.

To this end, my invention consists in certain features of construction and combinations of parts, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation, with a portion of the circuit breaker in section, of the series conductor used in carrying out the invention. Fig. 2 is a cross section on the line 2—2 in Fig. 3, showing in detail the conductor and the circuit making and breaking contact which slides upon the conductor. Fig. 3 is a detail side elevation of the conductor and the sliding contact. Fig. 4 is an enlarged cross section of the switch box and circuit closing mechanism, on the line 4—4 of Fig. 1. Fig. 5 is a detail plan of the conductor and moving circuit. Fig. 6 is a cross section of a form of conduit adapted for use in carrying out the system, showing also the arrangement of the conductor within it. Fig. 7 is a detail longitudinal section of the conduit, showing the

conductor and its supports in side elevation. Fig. 8 is a diagrammatic view of a series system railway embodying my invention; and Fig. 9 is a similar view, but with the connections in parallel.

The conduit 10, may be of any approved form, and it has an opening in the top, this being made between a split rail 11 which forms no part of my invention. Extending longitudinally through the conduit is a conductor made up of a series of sections 12, each section being of a length somewhat less than that of a car to be used on the road, and the conductor is preferably made in the form of an inverted T-iron, as shown in the drawings. A parallel conductor 13 extends alongside of the conduit, and this may be used either as a return conductor or as a feeding conductor to supply electricity to the sections 12. The ends of the sections 12 are separated, as shown at 14, and over these breaks are switch boxes 15, which are supported by bronze arms 16 which are secured to the adjacent sections 12, and the arms have upturned outer ends which are screwed into insulators 17, these being supported from the bottom of the rail 11. If desired, however, the switch boxes may be made of insulating material and secured directly to the rail. In each switch box and on one side thereof, is a contact fork 18, opening inward and connected with one section of the conductor 12, as shown by the wire *a* in Fig. 4.

Pivoted centrally in the lower portion of the switch box 15, is a switch or circuit breaker 19, which has a bent arm 20 on its upper side, and the arm registers with the contact fork 18, so that when pushed into the fork, contact will be made therewith and the circuit closed. The switch 19 is connected with the section 12 of the conductor next to the section with which the fork 18 is connected. The switch has depending diverging arms 21, which are adapted to contact with the upturned and outwardly curved wings or blades 22, of a sliding contact 23, this contact being adapted to be carried by a plow or other arrangement connected with the car and extending downward through the split rail 11. The contact is made in two parts, and these are provided at the bottom with abutting

flanges 24, which are bolted together. This arrangement permits the contact to be easily applied to the conductor 12. The wings or blades 22 have their outer surfaces at a constant distance, and each blade is wider at one end than at the other, the wider portion of one blade coming opposite the narrower portion of the other, consequently as the contact is moved, the wider end of one blade will strike one of the arms 21 of the switch 19, so as to operate the switch to close the circuit, and the thicker end of the opposite blade will throw the circuit open.

In Figs. 8 and 9, I have shown a diagram of circuits and modified forms of contacts and circuit breakers. In these figures, a wedge-shaped opening 14 is left between the ends of the sections 12, and wedge-shaped contacts 25 are adapted to normally close the opening and consequently close the circuit through the conductor sections, and the contact 23^a has vertical blades 22^a arranged substantially like the blades 22 described above, these blades being adapted to contact with rollers 25^a carried above and below the contact wedges 25. Consequently, when a contact is moving in the direction of the arrow in Fig. 8, the upper blade will strike the upper roller 25^a, and open the circuit, and the lower blade will immediately after strike the lower roller and close the circuit. Either of the forms of circuit breaker may be used; or other modifications of the same.

In carrying out the invention, two contacts are used and connected with each end of a car, and the system operates as follows: The contacts at opposite ends of the car are arranged so that the blades will incline in opposite directions, as shown in Fig. 8, and if the connection is in series, as is shown, and the car or train is moving in the direction of the large arrow, the front contact as it passes between the rollers 25^a will leave the contact wedge 25 raised so as to make a break at the point 14, and the rear contact is arranged so that as it passes between the rollers it will press last upon the lower roller and push down the contact so as to close the circuit. It will be seen by this arrangement that at least one break will always be made between the two contacts and that the last contact will close the circuit through the conductor section behind it. This arrangement will therefore prevent sparking, and it will cause the current to be shunted through the motors 26 on the car, and it will be seen that the entire current will pass through the car and back to the conductors so that a great many cars may be suc-

cessfully operated on the same circuit, as but comparatively little current is lost. In Fig. 9 the same arrangement is shown as in Fig. 8, except that the connection is in parallel. Here a main supply conductor 27 is used, which connects with the several contacts 25, by wires *b*, and the current is carried from the contacts through the motors 26 of the car in the manner already described and then returned through the return conductor 13. The only difference between this arrangement and that shown in Fig. 8, is that the circuit breakers on the passage of the contacts connect the conductor sections with the main conductor of the current. Instead of operating on the wedge-shaped conductors 25, the form of circuit breakers shown in Fig. 4 and contact shown in Fig. 5 may be used, the result being the same.

It will be understood that this system may be used overhead as well as in a conduit if desired.

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

1. In an electric railway, the combination, with the conductor arranged in sections and the switch boxes 15 arranged at junctions of said sections and having a contact 18, of the circuit breaker 19, which is pivoted and hangs in a vertical plane so as to swing transversely of the line of travel of the cars, the said circuit breaker having an upper contact arm, 20, and divergent arms, 21, on its lower end, the sliding contact, 23, having opposite and outwardly curved wings, 22, and adapted to be carried by the car so as to pass between said divergent arms, as shown and described.

2. In an electric railway, the combination, with the conductor constructed in a series of sections, of a circuit making and breaking switch arranged between each of the sections and having depending diverging arms, and a sliding contact held to slide on the sections, the contact having oppositely extending blades to engage the switch arms and open and close the switch, the blades being wider at one end than at the other, but having when united a constant distance between their outer edges, substantially as described.

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

MICHELANGELO CATTORI.

Witnesses:

AUGUSTUS O. BOURN,
W. B. ZANARDO.