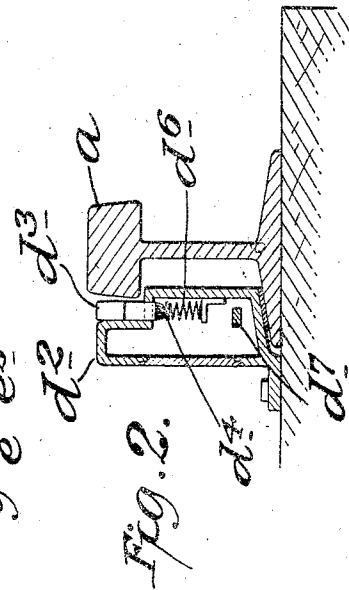
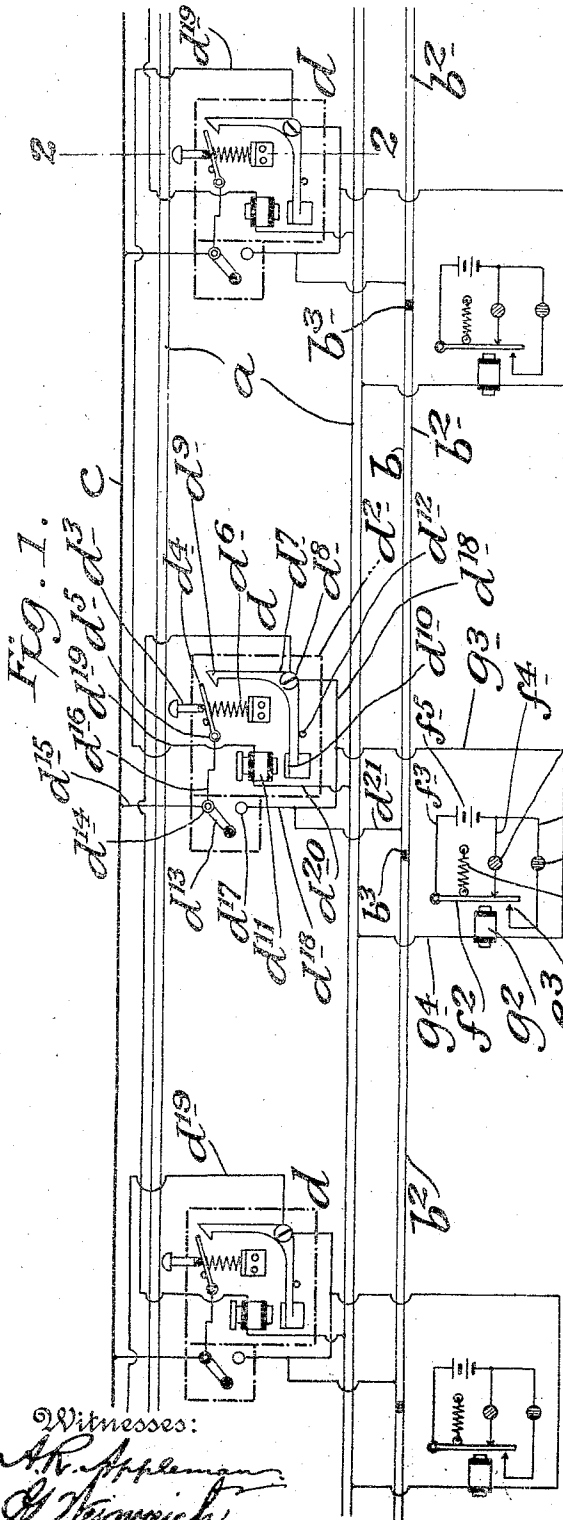


M. M. MARX.
 THIRD RAIL ELECTRIC RAILWAY SYSTEM.
 APPLICATION FILED JUNE 12, 1912.

1,063,206.

Patented June 3, 1913.



Morris M. Marx
 Inventor
 By his Attorneys *Edgar & Co.*

UNITED STATES PATENT OFFICE.

MORRIS M. MARX, OF NEW YORK, N. Y.

THIRD-RAIL ELECTRIC-RAILWAY SYSTEM.

1,063,206.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed June 12, 1912. Serial No. 703,119.

To all whom it may concern:

Be it known that I, MORRIS M. MARX, a citizen of the United States, and residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Third-Rail Electric-Railway Systems, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to third rail electric railway systems, and particularly to systems of this class in which the third rail is divided into separate insulated sections, and the object of the invention is to provide improved means whereby only those sections of the third rail over which a car or train is passing will be in circuit are energized by an electric current passing there-through; a further object being to provide a third rail electric railway system of this class with signal devices located at the entrance to each section or block of the track formed by the division of the third rail into sections, and which are operated, or in operation, as long as the car or train is passing over said block or section, thus giving notice to a following train that said block or section is occupied; other objects being to provide a third rail electric railway system of the class specified in which no covering for the third rail is required, and in which a high voltage can be employed at a minimum cost, and in which there will be no loss of current on account of dampness or rain, the rails of the track being normally dead, and in which there is a minimum of danger from short circuits or from persons being injured or killed by coming in contact with a live rail; a still further object being to absolutely prevent collision between cars or trains one of which is following another; and with these and other objects in view the invention consists in a third rail electric railway system constructed and operated as hereinafter described and claimed.

The invention is fully disclosed in the following specification of which the accompanying drawing forms a part, in which the separate parts of my invention are designated by suitable reference characters in each of the views, and in which:—

Figure 1 is a diagrammatic view of a third rail electric railway system involving my invention, and;—Fig. 2 a partial cross

sectional view on the line 2—2 of Fig. 1 and on an enlarged scale, and showing only parts of a switch mechanism which I employ.

In Fig. 1 of the accompanying drawing I have shown at *a* the track rails of a third rail electric railway system, at *b* the third rail which is divided into separate sections *b*² insulated, as shown at *b*³, and at *c* I have shown the main feed wire or conductor of an electric railway system of this class.

The division of the third rail *b* into separate sections or parts divides the railway system into separate sections or blocks, as will be readily understood, and the separate sections or parts of the third rail may be of any desired length or from one-eighth to one-half a mile or more, if desired. I also place at the beginning of each section or block of the railway, and inside one of the rails of the track and adjacent to one of said rails, a switch device or apparatus *d*, three of which are shown, and the construction of which is as follows:—The switch device or apparatus *d* involves a box or casing *d*² having a spring supported plunger *d*³ adapted to be operated by the flange of a wheel of a car or cars passing over the adjacent rail, and the plunger *d*³ operates in connection with a terminal arm *d*⁴ pivoted at *d*⁵ and held in operative position by a spring *d*⁶, and said terminal arm operates in connection with a bell-crank lever *d*⁷ pivoted at *d*⁸ and one arm of which is provided with a terminal hook-head *d*⁹ in connection with which the arm *d*⁴ operates, and the other arm of which is provided with a weighted armature *d*¹⁰ which operates in connection with an electro-magnet *d*¹¹.

The bell-crank lever *d*⁷ is normally supported in operative position by a stop pin *d*¹², and a switch arm *d*¹³ is pivoted at *d*¹⁴, and a conductor *d*¹⁵ leads from the feed wire *c* to the switch arm *d*¹³ and another conductor *d*¹⁶ connects the arm *d*¹³ with the arm *d*⁴. The counterpart of the switch arm *d*¹³ is a post *d*¹⁷ located adjacent to said arm *d*¹³, and a conductor *d*¹⁸ leads therefrom to the crank lever *d*⁷ at *d*⁸, and another conductor *d*¹⁹ connects the magnet *d*¹¹ of each switch device or apparatus *d* with the crank-lever of the next switch device or apparatus in front thereof, and another conductor *d*²⁰ connects the other side of the magnet *d*¹¹ with one of the rails *a* of the track, and a conductor *d*²¹ connects the conductor *d*¹⁸ with the corre-

sponding third rail section, and this completes the construction of the switch mechanisms or devices d .

Adjacent to and corresponding with each of the switch devices or mechanisms d or at the entrance to each of the blocks or sections of the track is placed a signal device or apparatus involving red and green lights e and f placed in two local circuits, the green light f being in a normally closed circuit formed by an armature arm f^2 , circuit conductors f^3 and f^4 and a battery f^5 , and the red light being in a normally open circuit formed by a conductor e^2 in connection with the conductor f and adapted to be closed by the armature arm f^2 , and the armature arm f^2 is operated in one direction by a spring g , and in the other direction by an electro-magnet g^2 placed in a circuit formed by conductors g^3 and g^4 , the first of which connects with the conductor d^{18} of the corresponding switch device or apparatus, and the other of which connects with one of the rails of the track.

With this construction, as a car or train passes over the rails of the track a wheel or the wheels thereof operate the plunger d^3 , and the arm d^4 is forced into engagement with the hook-head d^9 of the bell-crank lever d^7 . This establishes a circuit from the feed wire or conductor c through the conductor d^{15} , the conductor d^{16} , the arm d^4 , the bell-crank lever d^7 , the conductor d^{18} and the conductor d^{21} to the corresponding section b^2 of the third rail, and the car or cars get their power from said section of the third rail. At the same time another circuit is established through the conductor d^{18} , and the conductor g^3 , through the magnet g^2 and conductor g^4 to one of the rails of the track, and this energizes said magnet and draws the armature f^2 into engagement with the terminal e^3 of the circuit wire e^2 . This breaks the circuit through the green light f and establishes a circuit through the red light e and said red light remains in operation until the car or cars enter the next forward block. When the next forward block is reached the plunger d^3 of the corresponding signal device or apparatus d is operated by the wheel or wheels of the car or cars and the power circuit is established the same as in the last block, and a current is established through the wire d^{16} back to the magnet d^{11} of the block over which the car or cars have already passed, and through the conductor d^{20} to an adjacent rail of the track and said magnet is energized and the armature d^{10} of the corresponding bell-crank lever d^7 is drawn toward the corresponding magnet d^{11} , and the connection of the hook-head d^9 of said bell-crank lever of the corresponding arm d^4 is broken, and this also breaks the corresponding circuit through the corresponding section of the third rail together with the

circuit controlling the corresponding red light e , and this restores the circuit controlling the corresponding green light f .

The object of the switch formed by the parts d^{13} and d^{17} and their electrical connections is to provide means for establishing a power circuit by hand, if the mechanism of the switch device or apparatus, operated by the wheel or wheels of a car or cars, should get out of operation or become inoperative for any reason, at which time the switch arm d^3 may be thrown into connection with the parts d^{17} and a power circuit would be established through the conductors d^{15} , d^{18} and d^{21} , and this will also establish a circuit through the red light e of the corresponding signal device or mechanism.

In Fig. 1 of the accompanying drawing two full blocks of the track are shown and three of the switch devices or apparatus d and three of the signal devices or apparatus involving the red and green lights e and f , and from the foregoing description it will be seen that, as the train or car proceeds over the track the third rail section of each block is energized and the section behind is deenergized as the car or train reaches said block, and at the same time the red signal light e is energized or thrown into operation, and as the car or cars leave a block the power circuit through the third rail thereof is broken together with the circuit through the corresponding red signal light, while the circuit is completed through the corresponding green light, and while the construction and arrangement of parts shown and described is that which I prefer, it will be apparent that changes therein and modifications thereof may be made, within the scope of the appended claims, without departing from the spirit of my invention or sacrificing its advantages.

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

1. In a third rail electric railway system, a third rail which is divided into separate insulated parts dividing the track into blocks, a main feed wire or conductor, and a switch apparatus placed at the beginning of each block and in electrical connection with the corresponding third rail section and main feed wire, said switch device including a plunger operated by the wheel or wheels of a car or cars, an arm operated by said plunger, a spring for holding said arm and said plunger both in inoperative position, a bell-crank lever one arm of which is provided with a hook-head adapted to be engaged by said arm and the other arm of which is provided with an armature and a magnet in connection with which said armature operates.

2. In a third rail electric railway system, a third rail which is divided into separate

insulated parts dividing the track into blocks, a main feed wire or conductor, and a switch apparatus placed at the beginning of each block and in electrical connection
5 with the corresponding third rail section and main feed wire, said switch device including a plunger operated by the wheel or wheels of a car or cars, an arm operated by said plunger, a spring for holding said
10 arm and said plunger both in inoperative position, a bell-crank lever one arm of which is provided with a hook-head adapted to be engaged by said arm and the other arm of which is provided with an armature and a
15 magnet in connection with which said armature operates, said arm being in electrical connection with the feed wire and said lever with the corresponding section of the third rail.

20 3. In a third rail electric railway system, a third rail which is divided into separate insulated parts dividing the track into blocks, a main feed wire or conductor, and a switch apparatus placed at the beginning

of each block and in electrical connection 25 with the corresponding third rail section and main feed wire, said switch device including a plunger operated by the wheel or wheels of a car or cars, an arm operated by said plunger, a spring for holding said arm 30 and said plunger both in inoperative position, a bell-crank lever one arm of which is provided with a hook-head adapted to be engaged by said arm and the other arm of which is provided with an armature, a 35 magnet in connection with which said armature operates, and a signal apparatus placed at the beginning of each block and in electrical connection with the corresponding switch apparatus. 40

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 10th day of June, 1912.

MORRIS M. MARX.

Witnesses:

C. MULREANY,
D. COLLINS.