No. 823,067. PATENTED JUNE 12, 1906.

J. L. MOORE.

ELECTRIC RAILWAY SYSTEM.

APPLICATION FILED NOV. 16, 1904.

3 SHEETS—SHEET 1.

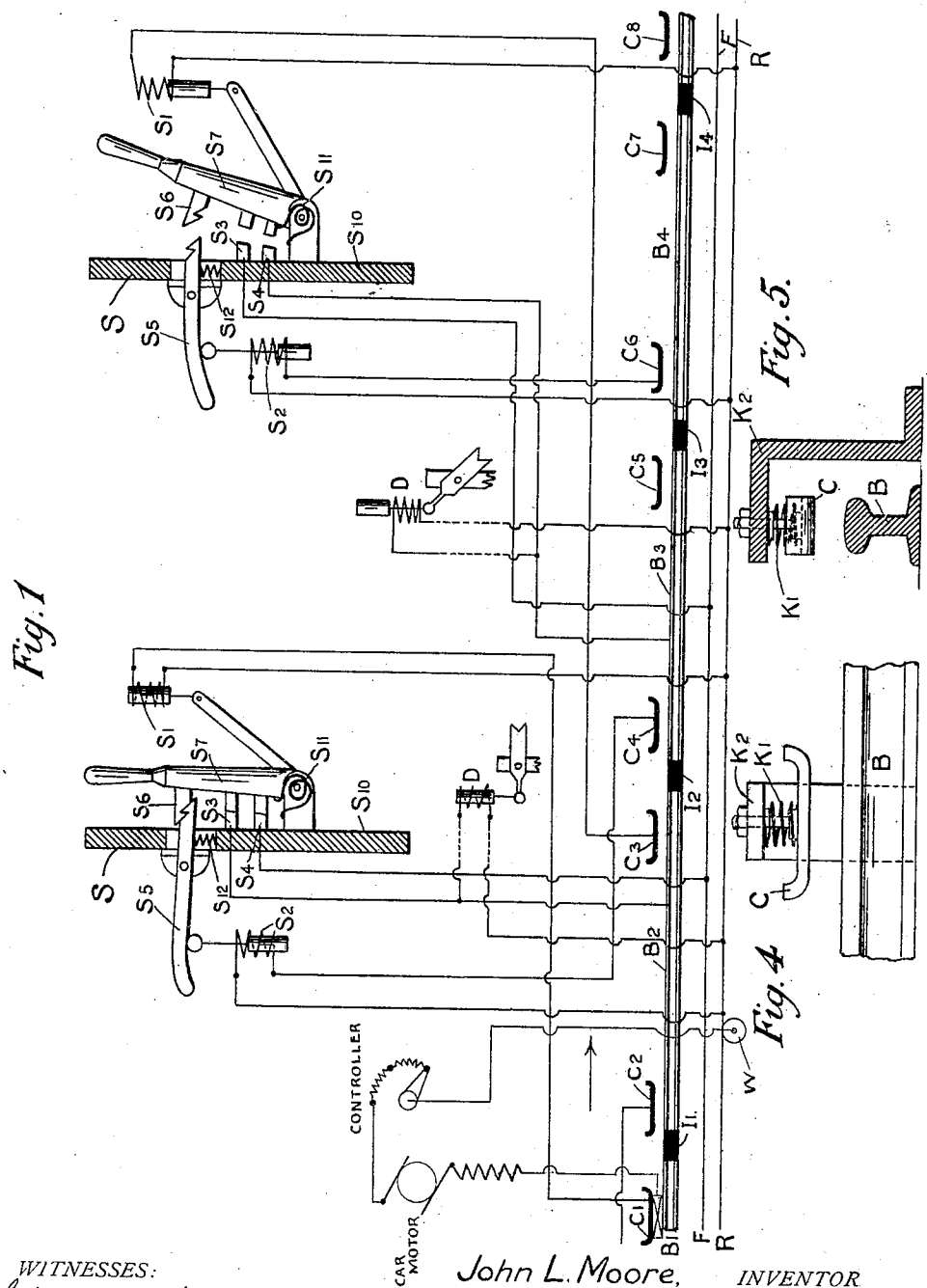

Fig. 1

Fig. 5.

Fig. 4

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3 SHEETS—SHEET 2.

Fig. 3.

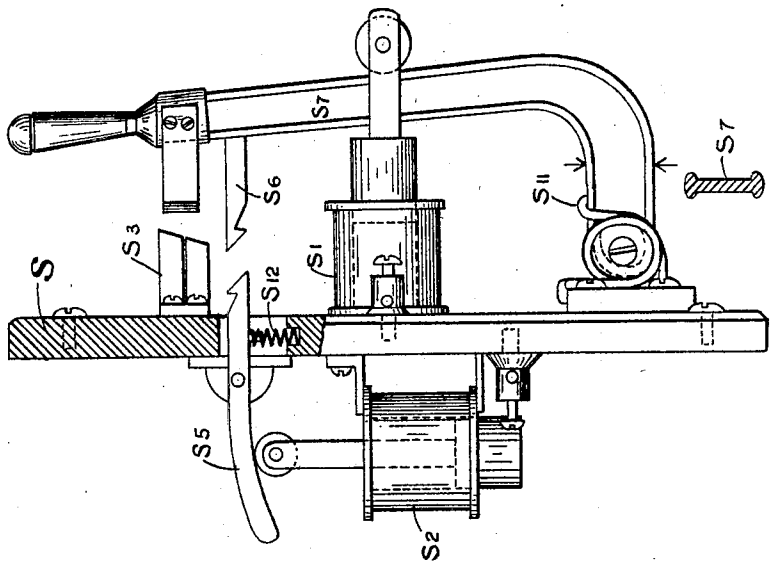
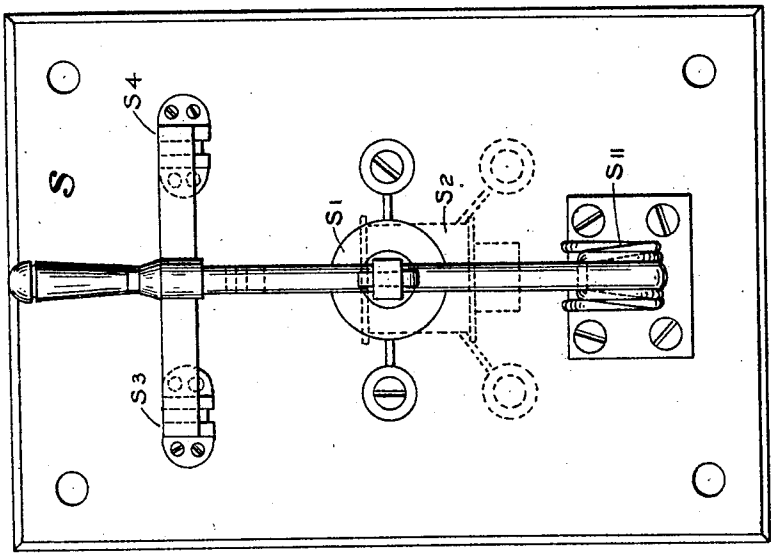


Fig. 2



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3 SHEETS—SHEET 3.

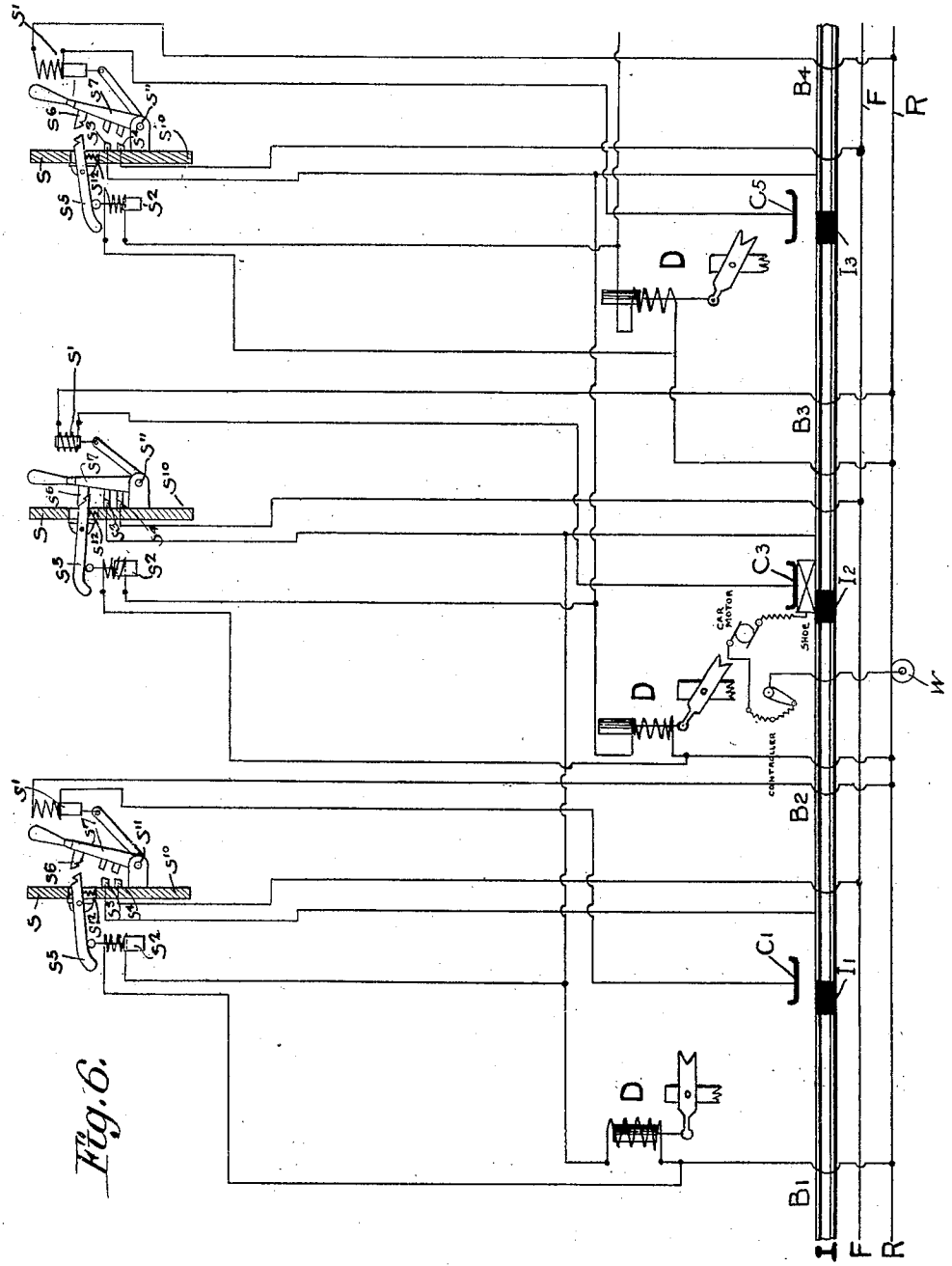

Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHN L. MOORE, OF NEW YORK, N. Y.

ELECTRIC-RAILWAY SYSTEM.

No. 823,067. Specification of Letters Patent. Patented June 12, 1906.

Application filed November 16, 1904. Serial No. 232,995.

To all whom it may concern:

Be it known that I, JOHN L. MOORE, a citizen of the United States of America, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Electric-Railway Systems, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of my invention is to produce an economical and efficient system for utilizing electricity as the motive power in railways; and my invention consists of the various novel arrangements and devices employed by me in accomplishing the above-named object.

The foregoing and other features of my invention relating to the control and operation of the third rail and signals will now be described in connection with the accompanying drawings, forming part of this specification, in which I have represented mechanism embodying my improvements in their preferred forms, after which I shall point out more particularly in the claims those features which I believe to be new and of my own invention.

In the drawings, Figure 1 is a diagrammatical sketch of my system, showing two switches with their blocks electrically connected. Fig. 2 is a front elevation of the switch. Fig. 3 is a side elevation thereof. Fig. 4 is a front elevation of the spring-contact. Fig. 5 is a side elevation thereof, in part section, showing the relation between the contact-plate and the third rail B. Fig. 6 is a modified form of my system, which is explained in a paragraph by itself.

In carrying out my invention I provide a third rail divided into convenient block-sections $B' B^2 B^3$, &c., insulated from the ground and from each other at $I' I^2 I^3$, &c. This third rail is ordinarily dead, the sections being charged only when in use. F is a feeder or feeders carrying the power, and R is the return-wire, rail, or may be the ground.

Referring particularly to Fig. 1, I provide at either end of each block-section B a spring-contact C, adapted to make contact with the shoe plow or trolley on the car, and through the plow or trolley be connected to the third rail B. Contacts $C' C^3 C^5$, &c., are connected to the return-wire R through the magnet of solenoid S′ of the respective switches S of their respective blocks. This solenoid is energized and closes the switch S when the plow or trolley electrically connects the contact with the third rail. Contacts $C^2 C^4 C^6$, &c., are connected to the return-wire R through the magnet S^2 of respective switches, which is adapted to open the switch when the plow or trolley electrically connects the contact with the third rail.

The switch S, Figs. 2 and 3, may be of any convenient type having a solenoid S′, which when energized closes the switch and connects the contacts S^3 and S^4, thereby charging that section of the third rail in which the car is about to enter. On the blade S^7 of the switch S is a latch S^6, which engages the latch S^5, mounted on the switchboard S^{10}. The latch S^5 is pressed into locking position by the spring S^{12}, and the solenoid S^2 when energized trips the latch S^5 and allows the switch to open under pressure of spring S^{11}.

Any suitable signal may be connected in circuit between the switch S and the return-wire or ground. If the signal is a solenoid-actuated semaphore, it may be connected, as shown in Fig. 1, one side of the solenoid-magnet being connected to the contact S^3 or S^4 of the switch S, the other to the ground or return wire R. This signal will show "danger" when the switch S is closed. These signals are not shown located at definite places in Fig. 1. They may be located anywhere desired along the track where they will hold a following train at a safe distance from that train ahead which is successively operating and controlling the signals.

The spring-contact may be of any desired form having a plate or contact C held so as to make good contact with plow or trolley by the compression-spring K′, mounted in holder or stand K^2 directly over or adjacent to the rail B. (Shown in Figs. 4 and 5.)

Referring particularly to Fig. 6, the arrangement of block-sections, feed-wire, and block-switches remains unchanged. Contacts $C^2 C^4 C^6$, &c., have been dispensed with, making it necessary to change the connection of solenoid-magnet S^2. Contacts S^3 and S^4 and solenoids S′ are connected, as before. The solenoid S^2 is connected in circuit between the contact S^3 of the switch in one block and the return-wire R or the ground in the second block to the rear. So likewise is the solenoid D of the semaphore. The solenoid S^2 of the switch S and the solenoid D of the semaphore are therefore in multiple arc and are both energized when the section of third-rail or other form of conductor to which they are connected through the switch S is energized.

The operation of the system, as shown in Fig. 6, is as follows: When the car (typified by its "motor," "controller," and wheel W) is about to enter block B^3, for example, the shoe makes contact with the contact-plate C^3 before leaving live-rail section B^2 and sends current through solenoid S', closing the switch, connecting contacts S^3 and S^4, and making the third-rail section B^3 alive and also sending current through solenoid S^2 of block B^2 to unlock its switch and through solenoid of semaphore D of block B' to set the signal to "danger" there.

The switch in block B^2 is kept open, and the section remains dead until a succeeding train is about to enter into it. Should a car drift past contact-plate C' when signal is at "danger," the block B^2 being dead, the car would be without power, and it would therefore be impossible to run into car in block B^3.

The *modus operandi* of the system in Fig. 1 is as follows:

The plow or trolley of the car or train travels along the third rail B, and when it comes in contact with C' the solenoid S' of the switch operating the preceding block in advance is energized and closes the switch S, charging the third-rail section and operating the semaphore or signal. The train entering the block, the plow or trolley makes contact with C^2, energizing the solenoid S^2 of the switch operating the block which the car or train just left, tripping the latch S^5, allowing the switch to open, cutting out of circuit the block-section, and leaving same dead until the next train is about to enter that block. The signal has returned to "safety," which notifies the car following that the block is unoccupied.

This system has the important advantage of electrical economy, doing away with the leakage of a constantly-charged third rail, since only one section of the third rail is in main feeder-circuit at one time, and then for but a short period. This also means a reduction in size of third rail. The signals being operated by the same source of power used for propulsion of trains the customary batteries may be dispensed with.

I wish it distinctly understood that my system as herein illustrated and described is in the form which I desire to construct it and that any changes or variations may be made as may be convenient or desirable without departing from the salient features of my invention, and I therefore intend the following claims to cover such modifications as naturally fall within the lines of invention.

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

1. In an electric-railway system having a working conductor divided into insulated sections, a switch for each section controlling the flow of power-current thereto, a magnet for closing said switch and a magnet for opening the switch, in combination with spring-pressed contact-plates severally connected to said magnets and mounted directly above the sections of said working conductor and adapted to electrically engage the upper surface of the current-collector of the trains traversing the system, whereby the collector completes successively through itself a path of current between said sections and said plates.

2. In an electric-railway system, the combination with a working conductor, of a current-collector for traveling thereon, a contact-plate mounted directly above said conductor and spring-pressed toward the contact-surface thereof whereby to electrically engage the upper surface of the said current-collector to receive current therethrough from said conductor.

3. In an electric-railway system having a working conductor divided into insulated sections, a switch for each section controlling the flow of power-current thereto consisting in the combination of a lever S^7 mounted upon a suitable foundation and bearing a pair of contacts and normally held in retracted position by a spring, a pair of coacting contacts, a latch for holding the switch closed and said contacts electrically engaged, a solenoid-magnet on the side of the foundation with said lever for closing the switch and a solenoid-magnet on the opposite side of the foundation for tripping said latch to allow the switch to open, said magnets being energized successively through the agency of a passing train whose power-current is controlled by said switch.

This specification signed and witnessed this 22d day of October, A. D. 1904.

JOHN L. MOORE.

In presence of—
M. C. FRANKLAND,
EDWD. VANWINKLE.