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S. M. YOUNG.

ELECTRIC SIGNALING SYSTEM.

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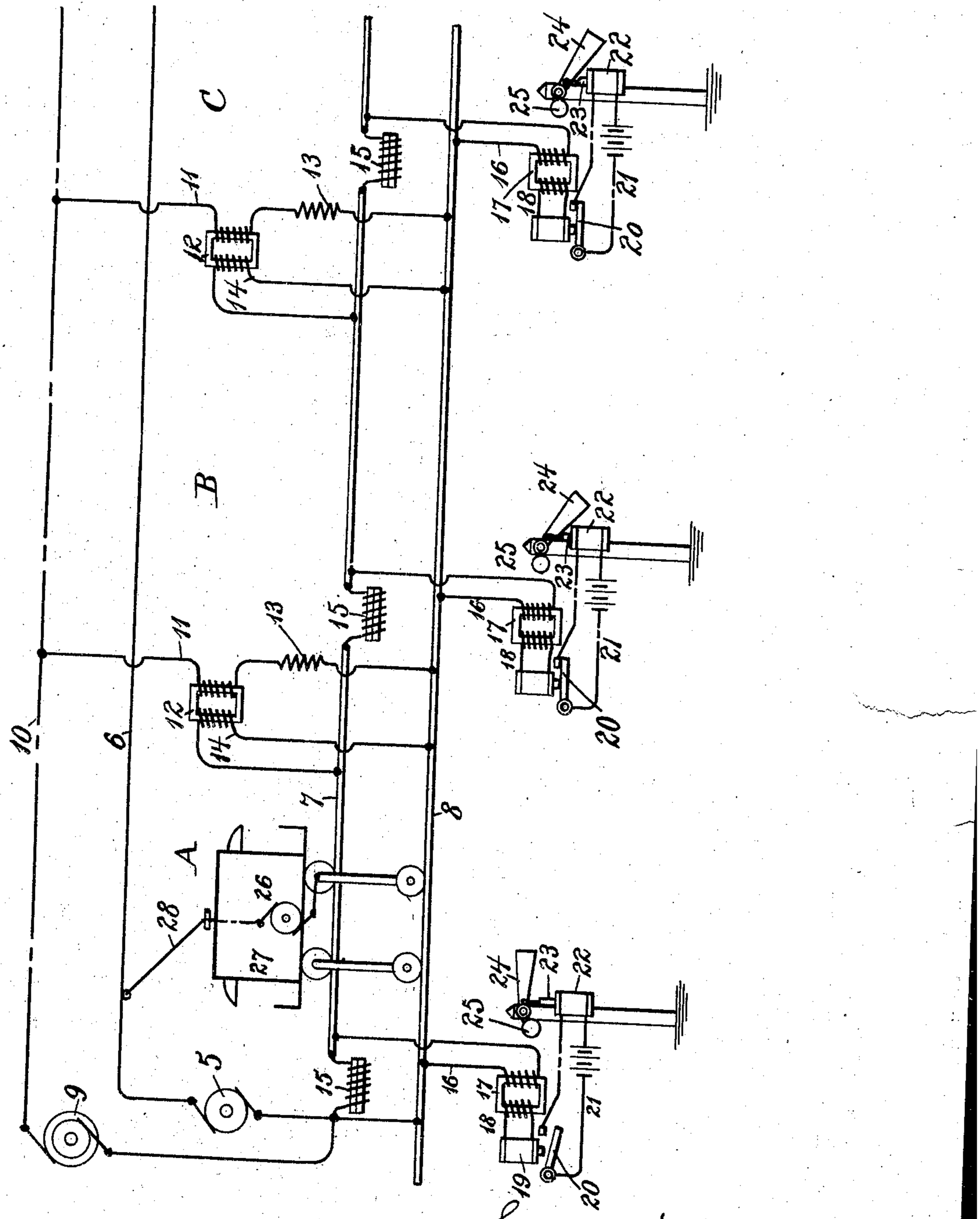

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ELECTRIC SIGNALING SYSTEM.

No. 815,890. Specification of Letters Patent. Patented March 20, 1906.

Original application filed February 21, 1903, Serial No. 144,548. Divided and this application filed October 18, 1904. Serial No. 228,953.

To all whom it may concern:

Be it known that I, SAMUEL MARSH YOUNG, a citizen of the United States, residing at New York city, county and State of New York, have invented certain new and useful Improvements in Electric Signaling Systems, of which the following is a specification.

My invention consists in an automatic signaling system for electric railways, which system comprises the following combined instrumentalities: a source of power-current, a source of signaling current, a trackway consisting of two rails each connected to the source of power-current and each electrically continuous for the power-current, means for exciting an alternating difference of potential between the rails, means for dividing the rails into block-sections and for preventing the alternating difference of potential between the rails of a block-section from in any wise influencing the alternating difference of potential between the rails of adjacent block-sections, a signaling device in each block-section normally energized by the difference of potential between the rails of the block-section, and means controlled by the movements of the cars which will control the movements of the signaling devices, the object of my invention being to provide means whereby the condition of any block-section of the railway may be visibly, audibly, or otherwise indicated—as, for instance, through the operation of semaphore-arms, bells, lights, or similar well-known devices—or whereby the speed of movement of any car or cars upon the railway may be modified upon entering, while in, or leaving any block-section of such railway—as, for instance, by automatically varying the resistance of the motor-circuit.

Considered broadly, my improved system involves the employment of a power-current conveyed along the railway through a feeder-conductor and back to the power-generator through each rail separately as the means for operating the cars upon the railway, an alternating current segregated between the block-sections as the means for normally operating the signaling devices, and in utilizing the movement of the cars into and while in a block-section to shunt the alternating current around the signaling device of such block-section.

The accompanying diagram will serve to illustrate my invention.

5 indicates the power-generator; 6, power-feeder; 7 8, traffic-rails The rail 7 is divided into block-sections A B C. The rail 8 is continuous. Both rails are connected to the power-generator 5.

9 is the signal-generator; 10, signaling-feeder.

Connected across the signaling-feeder 10 and the traffic-rail 8 is the primary 11 of a transformer 12. Interposed in this primary is a resistance 13, (a condenser may be used.)

Connected across the traffic-rails 7 8 is the secondary 14 of a transformer 12. Interposed between segments of the divided rail 7 are reactance-bonds 15. These bonds are constructed to freely permit the passage of the power-current, but interpose reactance to the alternating potential excited by the secondary of the transformer 12 between the rails 7 8 of a block-section.

Connected across the rails 7 8 of each block-section is the primary 16 of a transformer 17, and across the secondary 18 of such transformer is the magnet 19 of a relay.

20 represents the armature of the relay, which is adapted when attracted by the magnet 19 to close a local circuit 21, in which is a solenoid 22, having its core 23 connected to one arm of a semaphore 24. The semaphore is provided with a weight 25, which carries the arm 24 to "danger" when uninfluenced by the solenoid 22.

26 indicates a motor upon a vehicle 27, and 28 a collector device.

The operation of my system will be readily understood. The current from the power-generator 5 flows through motor 26 and thence by traffic-rails 7 8 back to the source of power-current. It will be seen that the rails 7 8 form separate return-paths to the power-generator. This arrangement is of great practical value for the following reasons: First, it provides two return paths of practically equal resistance to the power-generator. Second, it increases the factor of safety of the system in that should one rail be broken the other rail will remain as a return-path for the power-current. Third, it saves the cost of an auxiliary return-conductor, which must be provided when the divided rail cannot be used as a return-path for the power-current. The alternating current from the generator 9 excites the transformers 12, and such current is divided between the successive blocks A B C. The transformers through their secondaries effect a difference of potential between the rails 7 8, which difference of potential normally ex-

cites the transformers 17, and through their secondaries relay-magnets 19, which attract their armatures 20, thus closing the local circuits 21, and through the solenoids 22 drawing the semaphore-arms to the clear position, as illustrated in block-sections B C. The difference of potential between the rails 7 8 of each block is distinctly limited to each block by reason of the reactance-bonds 15, interposed between the rail-sections and one rail-section and the generator 9. When a car 27 enters a block, the wheels and axles of the car short-circuit the primary of a transformer 17, connected across the rails of the block, and thus deënergize such transformer and relay-magnet 19, the armature of which drops and opens a local circuit 21, thereby allowing the semaphore to be moved by the weight 25 to the danger position, as shown in block-section A.

This application is a division of my application, Serial No. 144,548, filed February 21, 1903, and generally describes the apparatus involved in carrying out the method of operation described in my companion application, Serial No. 160,086, filed June 4, 1903.

Having thus described my invention, I claim—

1. A signaling system comprising a source of power-current, a source of alternating current, a distributing-circuit having the traffic-rails divided into blocks and in which each of the traffic-rails separately and independently serves as a return-path to the sources of current, motor-vehicles actuated by one current, signaling devices actuated by the other current, and means controlled by the movements of the motor-vehicles for controlling the movements of the signaling devices.

2. A signaling system comprising a source of power-current, a source of alternating current, conductors leading therefrom comprising independent outgoing conductors and separate and independent return-conductors to the sources of current, motor-vehicles actuated from one current, signaling devices actuated from the other current, and means carried by the moving vehicles adapted to deënergize the signaling devices.

3. A signaling system comprising a source of power-current, a source of alternating current, conductors leading from said sources of current comprising independent outgoing conductors and separate and independent return-conductors to the sources of current, transformers having their primaries connected across the outgoing conductor from the source of alternating current and a return-conductor, and signaling devices controlled by the current from the secondaries of said transformers.

4. A signaling system comprising a source of power-current, a source of alternating current, a system of conductors formed in part by the traffic-rails and divided into blocks, means whereby the power-current will flow over each of said traffic-rails as separate and independent return-conductors to the sources of current, means for creating an alternating difference of potential between the rails of each block, signaling devices in each block normally in the "clear" position through the influence of said alternating difference of potential, and motor-vehicles actuated by the power-current and provided with means for short-circuiting the signaling devices of the blocks when motor-vehicles move into the blocks.

5. A signaling system comprising, a source of power-current, a source of alternating current, a distributing system involving the employment of both traffic-rails as separate and independent return-conductors to the sources of current, transformers energized by said alternating current, signaling devices energized by said transformers, motor-vehices, and devices carried by said motor-vehicles for shunting the current from the transformers around the signaling devices.

6. A signaling system comprising a source of power-current, a source of alternating current, a working circuit wherein each of the traffic-rails form separate and independent return-paths to the sources of current, motor-vehicles in said working circuit energized by the power current, signaling devices in said working circuit energized by the alternating current, and means carried by the motor-vehicles for shunting the alternating current around certain of the signaling devices.

7. A signaling system comprising a source of power-current, a source of alternating current, a working circuit wherein each of the traffic-rails separately and independently form return-paths to the sources of current, motor-vehicles energized by the power-current, transformers energized by the alternating current, and relay devices energized by the current from the transformers.

8. A signaling system comprising a source of power-current, a source of alternating current, a working circuit wherein each of the traffic-rails separately and independently form return-paths to the sources of current and over which rails both currents are transmitted, motor devices actuated by the power-current, signaling devices actuated by the alternating current, and means for differentiating the power and alternating currents between the devices adapted to be actuated by them.

9. A signaling system comprising a source of power-current, a source of alternating current, a working circuit wherein each of the traffic-rails form separate and independent return-paths to the sources of current and over which both currents are transmitted, current-transforming devices having their

primaries connected across the terminals of the source of alternating current and their secondaries across block-sections of the traffic-rails, relays connected across the block-sections of the traffic-rails, and means for preventing the power-current flowing in the traffic-rails from flowing through said relays.

10. A signaling system comprising a source of power-current, a source of alternating current, a distributing system comprising an outgoing feeder over which a power-current is flowing, a feeder over which an alternating current is flowing, traffic-rails divided into independent block-sections and serving as separate and independent return-paths for both currents, means for creating a difference of potential between the traffic-rails of each block-section, a relay in each block-section normally energized by such difference of potential, and motor-vehicles carrying means adapted to short-circuit the relay of a section when the motor-vehicle moves into a section.

11. A signaling system comprising a working circuit divided into a series of independent sections each section formed in part by the traffic-rails and each of said traffic-rails serving as separate and independent return-paths to the sources of current, a power-current in said working circuit, an alternating current impressed upon said working circuit, a motor-vehicle actuated by said power-current, and signaling devices energized by said alternating current, said motor-vehicle carrying means for shunting said alternating current around the signaling devices of a section when a car enters a section.

12. In a signaling system, the combination of a source of power-current, a source of alternating current, a distributing-circuit involving the employment of the traffic-rails as separate and independent paths to the sources of current and such traffic-rails divided into block-sections, transformers having their primaries energized by the alternating current and their secondaries connected across the traffic-rails of a block.

13. A signaling system comprising two sources of electric energy differing in character, a distributing-circuit over which both currents are transmitted and formed in part by the traffic-rails of the system, said traffic-rails divided into blocks and adapted to separately and independently form return-paths to the sources of energy, motor-vehicles upon said railway actuated by one of said currents, signaling devices normally energized by the other of said currents, and means carried by the motor-vehicles for short-circuiting the signaling devices of a block as the vehicle moves into a block.

14. A signaling system comprising two sources of energy differing in character, a working circuit divided into a series of independent sections, each of said sections formed in part by a continuous rail and a divided rail, which rails separately and independently form return-paths for the currents employed in operating the railway, a motor-vehicle operated by one of said currents, and signaling devices actuated by the other of said currents, said motor-vehicle carrying means for shunting the current employed to actuate the signaling device of a section when a car moves into a section.

15. A signaling system comprising two sources of current differing in character, a working circuit divided into a series of independent sections and of which the traffic-rails form a part and serve as separate and independent return-paths to the sources of energy, means in said sections for differentiating said transmitted currents between a motor-vehicle and a signaling device, and means carried by the motor-vehicle for short-circuiting the signaling device when a motor-vehicle moves into a section.

16. A signaling system comprising two sources of current differing in character, a working circuit divided into sections and of which the traffic-rails form separate and independent return-paths to the sources of energy, reactance devices in the track-sections adapted to permit the flow of current from one source but to cut down the flow of current from the other source, motor-vehicles operated by the current from one source, signaling devices in each section operated by the current from the other source, and means carried by the motor-vehicle for short-circuiting the signaling devices when a motor-vehicle moves into a section.

17. A signaling system in which the traffic-rails serve as separate and independent return-paths for the power and signal currents to the sources of energy.

18. A system of automatic signaling comprising a source of power-current, a source of alternating signaling-current, a trackway divided into block-sections with each rail arranged to serve as a separate and independent return-path for the power-current, means for exciting an alternating difference of potential between the rails of each block-section, means for limiting the difference of potential excited in a block-section to that section, a signaling device in each block-section, and means controlled by the movements of the cars, which will control the movements of the signaling devices.

19. A system of automatic signaling comprising a source of power-current, a source of alternating signaling-current, a trackway divided into block-sections having one rail continuous and the other separated into insulated lengths and with each rail arranged to serve as a separate and independent return-path for the power-current, means for exciting an alternating difference of potential between the rails of each block-section, induct-

ance-bonds located to limit the difference of potential excited in a block-section to that section, a signaling device in each block-section, and means controlled by the movements of the cars, which will control the movements of the signaling devices.

20. A system of automatic signaling comprising a source of power-current, a source of alternating signaling-current, a trackway divided into block-sections with each rail arranged to serve as a separate and independent return-path for the power-current, an induction device interposed between the source of signaling-current and the rails of each block-section for exciting an alternating difference of potential between said rails, reactance devices for limiting the difference of potential excited in a block-section to that section, a signaling device in each block-section, and means controlled by the movements of the cars, which will control the movements of the signaling devices.

21. A system of automatic signaling comprising a source of power-current, a source of alternating signaling-current, a trackway divided into block-sections with each rail arranged to serve as a separate and independent return-path for the power-current, means for exciting an alternating difference of potential between the rails of each block-section, means for limiting the difference of potential excited in a block-section to that section, a signaling device in each block-section, and an induction device interposed between the rails and the signaling device adapted to be controlled by the movements of the cars and which will control the movements of the signaling devices.

22. A system of automatic signaling comprising a source of power-current, a source of alternating signaling-current, a trackway divided into block-sections with each rail arranged to serve as a separate and independent return-path for the power-current, means for exciting an alternating difference of potential between the rails of each block-section, means interposed between the blocks which will freely permit the passage of the whole power-current back to the source of power-current but limit the difference of potential between the rails of a block-section to that section, a signaling device in each block-section, and means controlled by the movements of the cars, which will control the movements of the signaling devices.

23. A system of automatic signaling comprising a source of power-current, a source of alternating signaling-current, a trackway divided into block-sections with each rail arranged to serve as a separate and independent return-path for the power-current, means for exciting an alternating difference of potential between the rails of each block-section, means interposed between the blocks which will freely permit the passage of the whole power-current back to the source of power-current, but limit the difference of potential between the rails of adjacent block-sections to the sections which at the time are unoccupied, a signaling device in each block-section, and means controlled by the movements of the cars, which will control the movements of the signaling devices.

24. A system of automatic signaling comprising a source of power-current, a source of alternating signaling-current, a trackway divided into block-sections with each rail arranged to serve as a separate and independent return-path for the power-current, means for exciting an alternating difference of potential between the rails of each block-section, means which will permit the free passage of the power-current, but present high impedance to the passage of the alternating current from block-section to block-section, a signaling device in each block-section, and means controlled by the movements of the cars, which will control the movements of the signaling devices.

In testimony whereof I affix my signature in the presence of two witnesses.

SAMUEL MARSH YOUNG.

Witnesses:
J. E. PEARSON,
FRANK O'CONNOR.