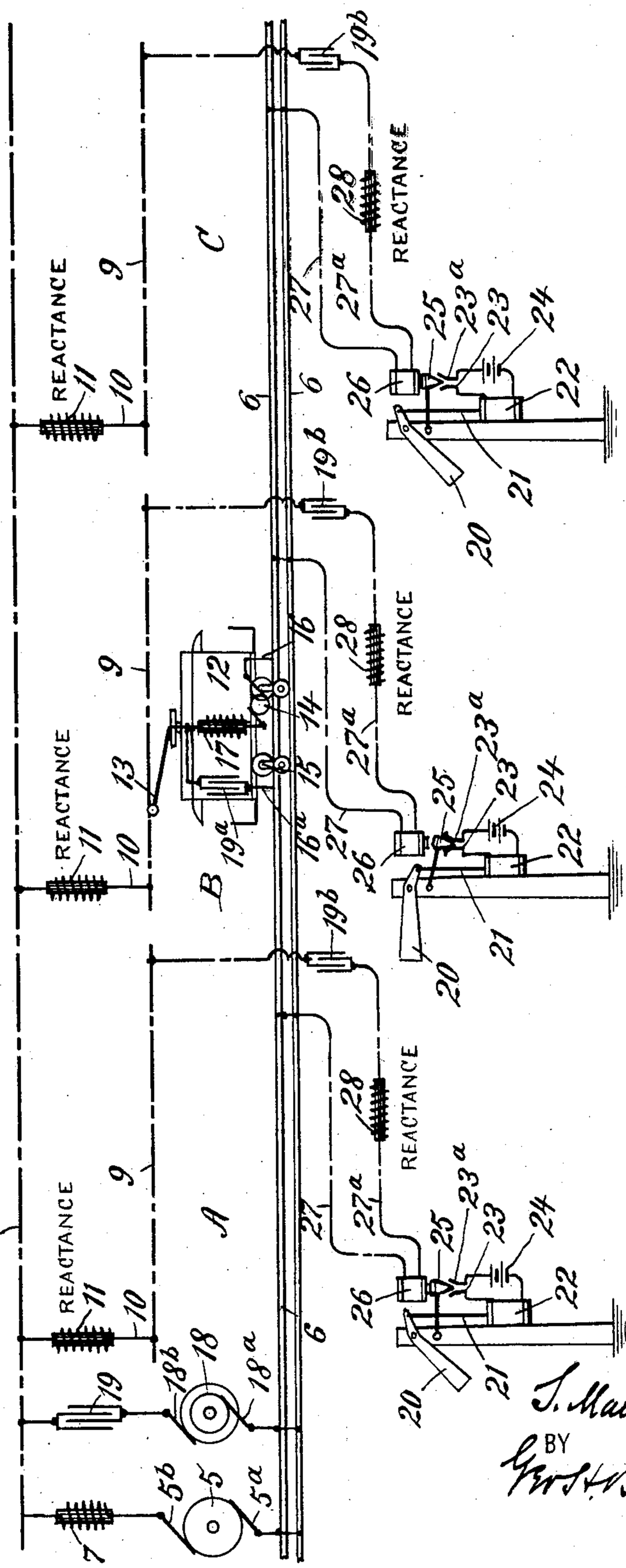
No. 762,370. PATENTED JUNE 14, 1904.

S. M. YOUNG.

ELECTRIC SIGNALING SYSTEM.

APPLICATION FILED JAN. 19, 1903.

NO MODEL.



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No. 762,370. Patented June 14, 1904.

UNITED STATES PATENT OFFICE.

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ELECTRIC SIGNALING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 762,370, dated June 14, 1904.

Application filed January 19, 1903. Serial No. 139,543. (No model.)

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 a signaling system especially adapted for use on electric railways where the motive power employed is a source of direct-current energy.

The object of my invention is to provide means whereby the condition of any section of the railway may be visibly, audibly, or otherwise indicated—as, for instance, through the operation of semaphore-arms, bells, lights, &c.—or whereby the speed of movement of any car or cars upon the railway may be modified upon entering or leaving any section of such railway—as, for instance, by automatically varying the resistance of the motor-circuit.

Various attempts have heretofore been made to design a block-signaling system for electric railways wherein the various signaling devices are adapted to be operated by the movement of a car into or out of a block, but without success, owing to the fact that it has been found practically impossible to control, through the movement of the car, any device or devices deriving their motor energy from the same source of power as that which imparts motion to the cars.

In order to accomplish the desired result, I have devised a system where the motive power for the cars is a source of direct current and for the signaling system a source of alternating current.

Considered broadly, my improved system involves the employment of an alternating current transmitted along the conductors conveying the direct current and adapted to energize, except when shunted by the movement of a car in a block, signaling or other devices located in the block.

My invention also contemplates the employment of condensers, choking-coils, or the like whereby the direct current and the alternating current transmitted along the same conductors will not interfere or in anywise affect each other or flow in paths other than those in which they are designed to operate.

Described in other terms, my invention consists, broadly, in providing means for operating an electric-railway system by a direct current, as is usual, and signaling or other similar devices by an alternating current and utilizing the movement of the cars actuated by the direct current to control the movements of the devices actuated by the alternating current.

My improved signaling system may also be used for other purposes, and I wish it understood that I consider myself to be the first to suggest and show how an alternating current may be impressed upon a direct current and transmitted through the conductors upon which a direct current is flowing and utilized through devices actuated by the direct current to actuate mechanism for signaling or otherwise.

The accompanying diagram will serve to illustrate my invention.

Referring to the diagram, 5 indicates a source of direct-current energy for operating the cars upon the railway. This source of energy may be a dynamo, storage battery, or other source of electric energy adapted to generate the required current. In the present case we will assume for the purposes of description that the dynamo will generate the usual five-hundred-volt current and in quantity sufficient for the purpose of the number of cars in use. The dynamo is shown as connected through one terminal, 5^a, to one of the main conductors 6 of the system, which conductor may be the rails or an independent conductor. The opposite terminal, 5^b, of the dynamo is connected through a choking-coil 7 with the opposite main or feeder conductor 8. Arranged over the railway is a sectional contact-conductor 9. In the diagram this conductor is shown as divided into three sections, thereby forming the three blocks A B C. This conductor may be arranged in any desired position relative to the railway. The contact-conductors 9 are each connected to the main feeder-conductor 8 through a conductor 10, in which is interposed a reactance device 11.

12 indicates a car provided with the usual trolley or other form of moving contact 13, adapted to contact with the sectional conductors 9; 14, motor upon the car. Moving contact with the main conductor or track 6 may be effected through the wheels 15 of the car or through a separate contact device 16. Located between the contacts 13 16 is a choking-coil 17.

The description so far as given has related wholly to the arrangement of the circuit through which the power which actuates the car or cars is transmitted and presents no points of novelty.

I will now describe the mechanism which is used in connection with such system for controlling the signals or other devices.

18 indicates a source of alternating current—for instance, an alternating dynamo. We will assume for the purposes of the present case that the electromotive force transmitted from this dynamo corresponds to that of the dynamo 5—*i. e.*, five hundred volts. The electromotive force employed, however, will depend upon the total resistance presented by the line and the devices in the line through which the current may be transmitted. The quantity of current transmitted will depend upon the energy necessary to move the devices adapted to be actuated by such alternating current. We will assume for the purposes of the present case that the energy required is one ampere. The dynamo 18 is connected through one terminal, 18^a, with the conductor 6 and through the opposite terminal, 18^b, with one terminal of a condenser 19. The opposite terminal of the condenser is connected to the main feeder-conductor 8. Mounted on the car 12 is a condenser 19^a, connected through one terminal to the contact 13 and through the opposite terminal to a contact 16^a, movable in relation to conductor 6. Located in each of the blocks A B C is shown a signaling device, which in the present instance consists of a pivotally-supported semaphore-arm 20. Attached to the rear of this arm is a rod 21, which forms a part of the core of a solenoid 22. Connected to the terminals of this solenoid are the contact-plates 23 23^a.

24 indicates a battery or other source of electrical energy. Mounted over the contacts 23 23^a is a pivotally-supported bridge-piece 25, and situated over such bridge-piece is a magnet 26. The terminals 27 27^a of this magnet are respectively connected to the conductor 6 and to one terminal of the reactance coil 28. The opposite terminal of this reactance coil is connected to one terminal of a condenser 19^b. The opposite terminal of this condenser is connected to one section of the contact-conductor 9.

In the drawings the semaphore-arms in blocks A and C are shown in the clear position and in block B in the danger position.

The signaling device shown is merely for the purpose of illustration. Any other suitable device which will give a visible or audible signal may be employed, or instead of using such a device I may use a device adapted to modify the motion of the car. I have not shown any such device, as it is now well known in the art.

The general operation of my device is as follows: The cars on the line will be operated by the direct current from the dynamo 5, delivered through feeder-conductor 8, sectional conductors 9, motor 12, conductor 6, back to dynamo, as is usual. The signaling devices will be actuated by the current flowing from dynamo 18, delivered through feeder-conductor 8, sectional conductors 9, magnets 26, conductor 6, back to dynamo, which current acts, as is shown in blocks A and C, to actuate the magnets 26, lift the bridge-pieces, and open the path between contacts 23 23^a and allow the semaphore-arms to drop to "safety." In the case of the block B the current passes from dynamo 18, feeder-conductor 8, sectional conductor 9, contact 13, condenser 19^a, contact 16^a, conductor 6, back to dynamo, or, in other words, the current from the dynamo 18 is shunted around the signaling device in block B.

The purpose of using the choking-coils 7 17, which are provided with laminated cores, is to prevent the alternating current from the dynamo 18 finding paths through either the direct-current generator 5 or motor 12 upon the car.

The object of using the condensers 19 19^a 19^b is to prevent the current from the direct-current dynamo 5 finding a path through the alternating dynamo 18, around the motor 12, or through the magnets 26.

The object of using the reactance coils 11 28 is to cut down the current from the alternating generator 18 before reaching the magnets 26.

It will be understood without further description that the choking-coils provided with laminated cores will act to stop the flow of an alternating current while presenting little resistance to the passage of a direct current, and, further, that the condensers, while presenting no practical resistance to the flow of an alternating current will totally stop the flow of a direct current.

I have shown reactance devices as included between the feeder-conductor 8 and the sectional conductor 9 and also between the sectional conductor 9 and the magnets 26. I do not wish to limit myself to the use of two reactance coils in series, as shown, as it may be found in practice that only one is necessary.

I make no claim in this application for the method of operation described, as the same has been made the subject of United States Letters Patent No. 757,537, granted April 19, 1904.

Having thus described my invention, I claim—

1. A signaling system comprising a source of direct current, a source of alternating current, a common feeder and a common return for both currents, motor-vehicles actuated by the direct current, signaling devices actuated by the alternating current, and means controlled by the movement of the motor-vehicle for controlling the movement of the signaling devices.

2. A signaling system comprising a source of direct current, a source of alternating current, a common feeder and a common return for both currents, motor-vehicles actuated from the source of direct-current energy, signaling devices actuated from the source of alternating-current energy, and means carried by the moving vehicles and adapted to shunt the alternating current around the signaling devices.

3. A signaling system comprising a source of direct-current energy, a source of alternating-current energy, main conductors connected to said source of energy, a choking-coil in series with the source of direct-current energy, a condenser in series with the source of alternating-current energy, sectional feeder-conductors connected to one of said main conductors, signaling devices connected to the other of said main conductors, and to said sectional conductor, cars actuated by the current from the direct source of energy, and carrying means which will shunt the alternating current around the signaling devices.

4. A signaling system comprising two sources of electric energy delivering currents differing in character, a system of conductors involving a sectional feeder and a common return for both currents from said sources of energy, motor-vehicles actuated by the current from one of said sources of energy, signaling devices connected across the sections of the feeder-conductor and the common return and actuated by the current from the other source of energy, means in said system of conductors for maintaining electric separation of the two currents transmitted, and means carried by the moving vehicles for shunting the current used to operate the signals around any one of the signals.

5. A signaling system comprising a source of direct-current energy, a source of alternating-current energy, a distributing-circuit, branch circuits leading from said distributing-circuit provided with means which prevent the passage of a direct current, but permit the passage of an alternating current, signaling devices in said branch circuits adapted to be actuated by an alternating current, a moving vehicle in said distributing-circuit, means on said vehicle for establishing contact relation between said source of direct current and said source of alternating current, and means for distributing said collected currents, the direct current through a motor and the alternating current through a path around the motor, and both of said currents back to their sources of production.

6. A signaling system comprising two sources of current differing in character, a system of distributing-conductors over which both currents are transmitted and formed in part by both rails of a railway, a motor-vehicle on such rails, a series of signaling-circuits over which only one of such currents is transmitted, signaling devices in said signaling-circuits, means for maintaining the electric separation of the two currents and confining their individual action to certain apparatus; one current to the operation of the motor-vehicle and the other to the operation of the signals; together with means carried by the vehicle for cutting a signaling device out of circuit.

7. A signaling system comprising a source of direct-current energy, a source of alternating-current energy, a sectional working circuit, a series of branch circuits connected to said working circuit, signaling devices in said branch circuits, a motor-vehicle in said working circuit, means for transmitting the direct-current energy to the motor-vehicle, means for transmitting the alternating-current energy to the signaling devices, and the interposed means whereby the direct and alternating currents will be limited to certain defined paths.

8. A signaling system comprising two sources of electric energy differing in character, a distributing-circuit for the currents from said sources of energy, formed in part by both rails of the railway, motor-vehicles actuated by the current from one source of energy, signaling devices in said distributing-circuit, electrically independent of each other and adapted to be operated by the current from the other source of energy, means for effecting and maintaining the separation of the two currents generated and delivering said currents to the respective apparatus designed to be operated thereby, a moving vehicle-carrying means for electrically isolating a signal when such car moves into the portion of the distributing-circuit in which said signal is located.

9. A signaling system comprising two sources of current differing in character, a feeder-conductor connected to both sources of current, rails connected to both sources of current, sectional working conductors connected to the feeder-conductor, signaling devices connected across the sectional conductors and the rails, moving vehicles, on the rails carrying contact devices which coact with the sectional conductors, means for differentiating said currents between the motor-vehicles and the signaling devices, and means carried by the motor-vehicles for electrically isolating a signaling device when the contact device carried by the vehicle is brought in

contact with the sectional conductor across which and the rails such signaling device is connected.

10. A signaling system comprising two sources of energy differing in character, a working circuit of which the rails form a part, and over which the said currents differing in character are transmitted, means for dividing said working circuit into blocks, a signaling device in each block, a moving vehicle, means for differentiating the currents differing in character between the signaling devices and the moving vehicle, and means for cutting a signal device out of circuit as a vehicle moves into a block.

11. A signaling system in which each of the track-rails separately serve as uninterrupted return-conductors to the sources of energy for the current employed to operate the vehicles and the current employed to operate the signals of said system.

12. A signaling system divided into a series of blocks and in which each of the track-rails separately serve as uninterrupted return-conductors to the sources of energy for the current employed to operate the vehicles and the current employed to operate the signals of said system.

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

SAMUEL MARSH YOUNG.

Witnesses:

J. E. PEARSON,

FRANK O'CONNOR.