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M. MILCH.

SYNTONIC SIGNALING SYSTEM.

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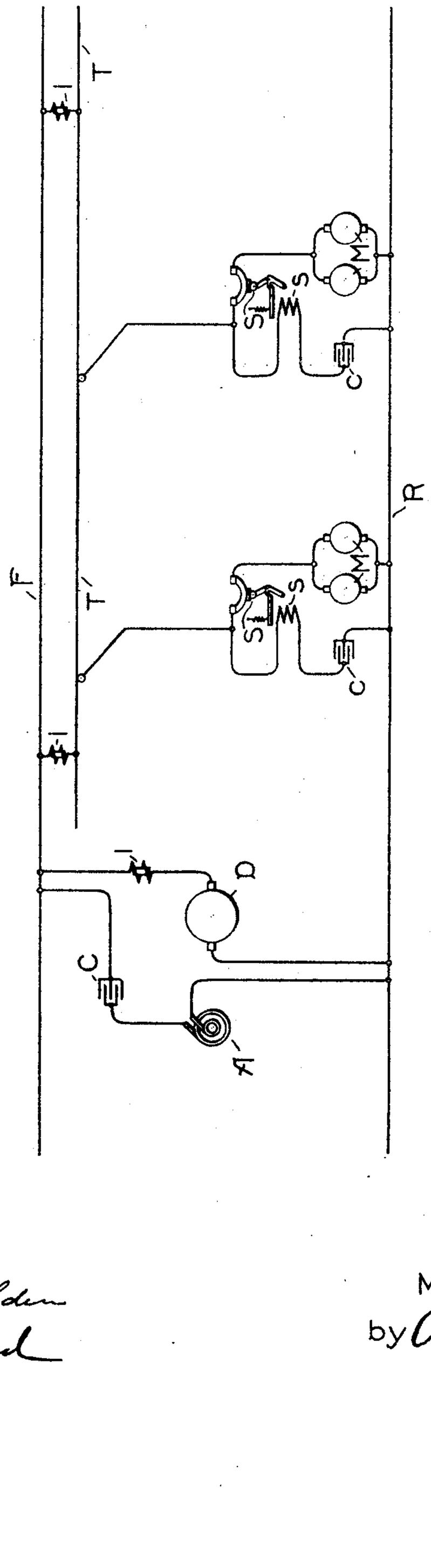

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UNITED STATES PATENT OFFICE.

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SYNTONIC SIGNALING SYSTEM.

No. 797,863. Specification of Letters Patent. Patented Aug. 22, 1905.

Application filed March 30, 1904. Serial No. 200,709.

To all whom it may concern:

Be it known that I, MAURICE MILCH, a subject of the King of Hungary, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Syntonic Signaling Systems, of which the following is a specification.

My invention relates to syntonic signaling systems; and its object is to provide a system of this nature which may be adapted for use as a railway block-signal system and which shall permit the signal to be given on the car itself, if desired.

In general my invention consists in impressing upon the power-circuit for the cars an alternating voltage of high frequency. The high-frequency signaling-circuit is completed by a circuit on any car which is operating on the power-circuit. This circuit on a car is arranged with proper values of inductances and capacity, so that with a single car-circuit connected to the source the high-voltage signaling-circuit is resonant and a comparatively large current flows; but when two cars are connected in parallel to the source the high-voltage signal-circuit is in non-resonant condition and a much smaller current consequently flows, which difference may be utilized for operating a protective device on the car, so giving warning that two cars are in the same block.

My invention will best be understood by reference to the accompanying drawing, in which A represents a source of high-frequency alternating-current voltage, and D represents a source of direct-current or of low-frequency alternating current. The two are connected in parallel across feeder F and the rail or return conductor R through discriminating devices, such as a capacity C and an inductance I, respectively. Capacity C prevents the flow of direct current or of any appreciable amount of low-frequency alternating current through the source A, at the same time offering practically no impedance to the flow of high-frequency current, and inductance I prevents the flow of any appreciable amount of high-frequency current through the source D, while at the same time offering practically no impedance to the direct or low-frequency current. The feeder F is connected, through a series of inductances *i i*, to the trolley-wire or third rail, which is formed as a sectional conductor composed of a number of sections T T, insulated from each other.

I have shown two car-circuits in the drawing. The power-circuit passes from the trolley-wire T through the switch or circuit-breaker S and through the usual controlling-switches (not shown) to the motors M and thence to the rail or return conductor R. The signal-circuit is connected in parallel with the power-circuit and includes, besides the condenser *c c*, the protective devices—as, for instance, a coil *s*, which when energized holds switch S of the power-circuit closed. The signal-circuit on each car has its capacity and inductance so proportioned relative to the inductances *i* that when only one car is in contact with one section of the trolley-wire the signal-circuit is in tune or resonant, and consequently sufficient current flows through the signal-circuit to enable coil *s* to hold switch S closed; but if a second car enters the block, as is shown in the drawing, the two car-circuits in parallel produce a non-resonant or untuned condition of the high-frequency circuit and the current in the signal-circuit is sufficiently reduced for operating the protective devices. Warning is thus at once given that two cars are in the block, and, if desired, the power-circuit of both cars may be opened by the tripping-coils *s*. Thus the second car will be unable to move until the first car is out of the block.

It is obvious that a number of variations may be made in the system that I have shown, different forms of protective devices may be used, and the connections and arrangements of the circuits varied without departing from the spirit of my invention.

Accordingly I do not desire to limit myself to the particular construction and arrangement of parts here shown, since changes which do not depart from the spirit of my invention and which are within the scope of the appended claims will be obvious to those skilled in the art.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In combination, a railway power-circuit including a sectional conductor, a source of high-frequency voltage connected to said circuit, car-circuits arranged to produce resonant circuit conditions for said high-frequency circuit when a single car-circuit is connected to a section of said conductor and non-resonant

conditions when two or more car-circuits are connected to one section of said conductor, and protective devices responsive to said non-resonant conditions.

2. In combination, a railway power-circuit including a sectional conductor, a high-frequency circuit in parallel therewith, car-circuits arranged to produce resonant conditions of said high-frequency circuit only when a predetermined number of car-circuits are connected to one section of said conductor, and a protective device included in said high-frequency circuit.

3. In combination, a railway-circuit comprising a sectional conductor and a continuous conductor, a source of power having its terminals connected to said conductors respectively, a source of high-frequency current connected in parallel with said source of power, car-circuits arranged to produce resonant circuit conditions for said high-frequency source only when a predetermined number of car-circuits are connected to one section of said conductor, and protective devices included in said car-circuits.

4. In a syntonic signal system for railways, a source of high-frequency voltage, a sectional conductor connected thereto and arranged to be engaged by moving cars, car-circuits adapted to produce resonant circuit conditions for said source only when a predetermined number of car-circuits are connected to one section of said conductor, and protective devices connected in the car-circuits.

5. In a syntonic signal system for railways, a high-frequency signal-circuit including a sectional conductor adapted to be engaged by moving cars, car-circuits arranged to produce resonant conditions in said high-frequency circuit only when a predetermined number of car-circuits are connected to one section of said conductor, and a protective device responsive to a variation in the amount of current in said high-frequency circuit.

6. In a syntonic signal system for railway-blocks, a high-frequency signal-circuit, means for rendering said circuit resonant when a predetermined number of cars are in a block, and a protective device responsive to a variation in the amount of current in said circuit.

7. In a syntonic signal system for railways, a high-frequency signal-circuit comprising a sectional conductor adapted to be engaged by moving cars, means for rendering said circuit resonant when a predetermined number of cars engage one section of said conductor, and a protective device connected in said circuit.

8. In combination, a power-circuit for electric railways including a sectional conductor, a source of power connected thereto, a source of high-frequency current connected thereto, discriminating devices connected between said sources and said circuit, a circuit on each car in parallel with the power-circuit of the car and containing a discriminating device and arranged to produce resonant circuit conditions for the high-frequency source only when a single car-circuit is connected to one section of said conductor, and protective devices in the car-circuits.

9. In an electric railway, a sectional conductor, a continuous feeder therefor, inductances connecting the sections of said conductor to said feeder, a source of power connected to said feeder, a source of high-frequency current connected to said feeder, means for producing resonant circuit conditions only when a single car engages one section of said conductor, and a protective device responsive to a diminution in flow of current in the high-frequency circuit.

10. In an electric railway, a sectional conductor, a continuous feeder therefor, inductances connecting the sections of said conductor to said feeder, a source of power connected to said feeder, an inductance in series with said source, a source of high-frequency current connected to said feeder, a capacity in series with said high-frequency source, car-circuits arranged to produce resonant circuit conditions for said high-frequency source, and protective devices in said car-circuits.

11. In an electric railway, a source of power, a source of high-frequency current, a sectional conductor, inductances connecting the sections of said conductor to said sources, means for producing resonant circuit conditions for said high-frequency source when a predetermined number of cars engage one section of said conductor, and a protective device responsive to non-resonant conditions.

12. In an electric railway, a source of power, a source of high-frequency current, a sectional conductor, inductances connecting the sections of said conductor to said sources, car-circuits arranged to produce resonant circuit conditions when a single car-circuit is connected to one section of said conductor, and protective devices in said car-circuits.

In witness whereof I have hereunto set my hand this 28th day of March, 1904.

MAURICE MILCH.

Witnesses:
BENJAMIN B. HULL,
HELEN ORFORD.