E. E. KLEINSCHMIDT.

ELECTRIC SIGNALING SYSTEM.

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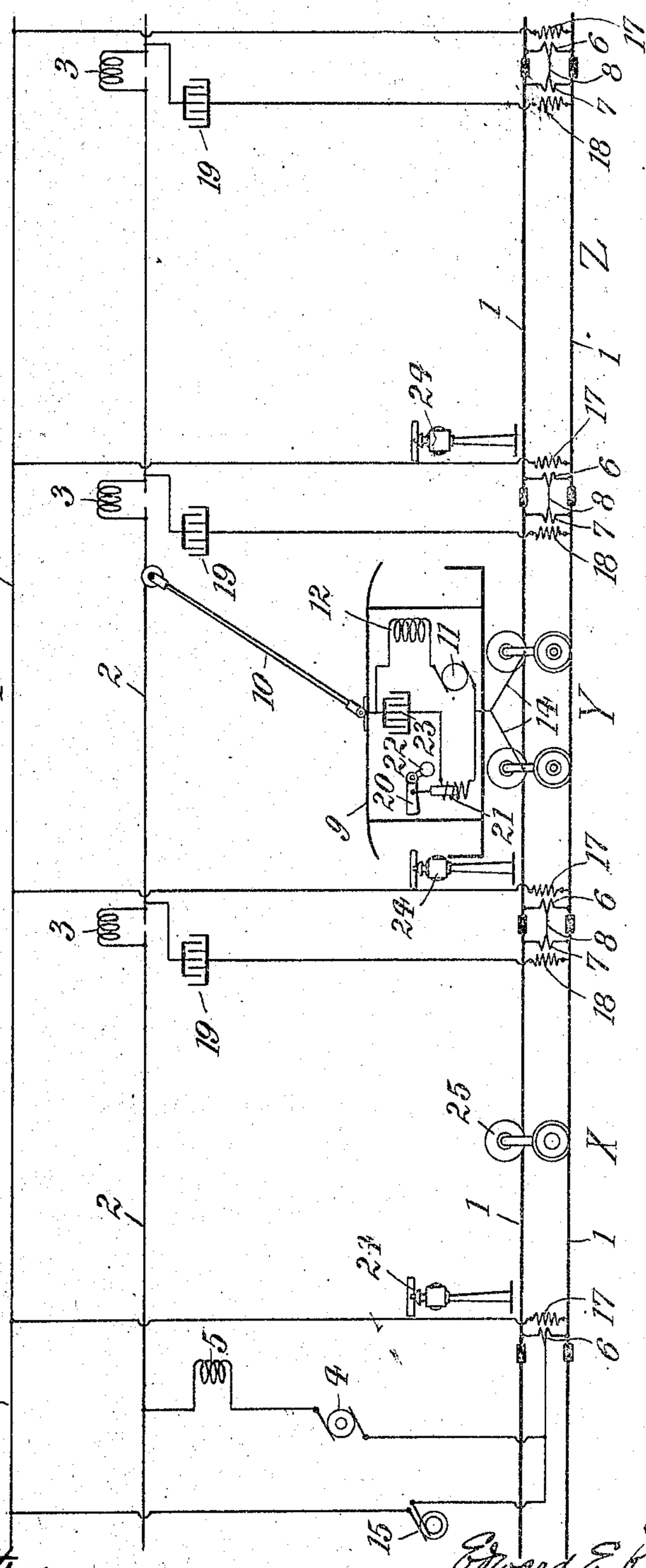

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ELECTRIC SIGNALING SYSTEM.

No. 905,327. Specification of Letters Patent. Patented Dec. 1, 1908.

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To all whom it may concern:

Be it known that I, EDWARD E. KLEINSCHMIDT, a citizen of the United States, and a resident of the borough of Brooklyn, city and State of New York, have invented certain new and useful Improvements in Electric Signaling Systems, of which the following is a specification.

My present system of electric signaling is applicable to railways and is shown for illustrative purposes as applied to a railway or more particularly to an electric railway operating on direct current.

In the drawing the figure is a diagrammatic view of the system applied to a direct-current railway.

Describing now my improvements with special reference to the devices of the drawings:—1—1 are the tracks of an electric railway system, insulated into block-sections, three of which are shown at X, Y, Z.

2 designates a power distributing conductor, in this specific embodiment taking the form of an over-head trolley-wire. This conductor 2 is in sections with impedance coils 3 connected across the sections. Said impedance coils or other equivalent devices permit the power current to pass but not the alternating current.

4 is a direct current generator connected across trolley-wire 2 and rails 1—1, an impedance 5 being interposed between the generator and trolley wire and part of a coil 6 between the generator and the rails. This coil 6 is connected across the rails and the generator connects with the middle of said coil. The coil 6 in block X is duplicated in each of the blocks Y and Z. A coil 7 in each of the blocks is connected across the rails of its own block and furthermore connects by a wire 8 with the coil 6 of the adjoining block. Preferably the wires 8 connect the coils 6 and 7 at central points in their windings as shown in the figure. Upon inspection these connections will be seen to energize both rails in all the blocks from the power generator 4.

9 is a car in block Y with trolley-pole or other traveling contact device 10. The motor 11 of the car, receives its current from trolley-wire 2 through pole 10 and impedance 12. The other brush of the motor connects by 14 with the running gear of the car and thus completes the power circuit through the motor to the rails.

Describing now the signaling circuit, 15 is an alternating current generator connected across the coils 6 and line wire 16. Said line wire 16 connects with one rail in each block through transformer coils 17. The same rail in each block connects with the section of trolley-wire in the block behind through transformer coils 18 and condensers 19. It will be understood that the coils 6, 17, 7, 18 constitute transformers the operation of which will hereafter be described. Carried by the car is a semaphore or other signaling device 20 operable by an alternating current. In the particular device illustrated, the semaphore is operated by solenoid 21 into clear position and when no current is passing through the solenoid, takes the danger position shown by the gravity action of weight 22. Said solenoid 21 connects by one terminal with the running gear of the car and by the other through a condenser 23 with the trolley-pole. Any convenient form of sign-posts 24 may be set up to mark the divisions between the blocks conveniently to the motorman.

25 represents a car in the block X ahead of car 9 in section Y.

Explaining now how the presence of car 25, sets the signal at danger in a car in the block behind, an inspection of the circuits in the figure will show that the generator 15 delivers its alternating current through coil 17 and through half of coil 6 in each block-section. The effect of this is to induce a current in coil 6 which will traverse the circuit formed by said coil 6, the two rails and the coil 7 connected across said rails at the other end of the block. Ordinarily this current in coil 7 would induce a current in coil 18 to clear the signal in any car in the block behind, but not when there is a car 25 in the block ahead, since the wheels and axles of this car short circuit coil 7 in block X and consequently there is no current in said coil to induce any current in coil 18. Consequently there being no current to operate the signal in the car, said signal gravitates into danger position, thereby indicating the car 25 in the block ahead. When said car 25 has proceeded out of block X, the coil 7 in said block being no longer short-circuited, receives current from coil 6, and itself induces a current in coil 18 which energizes solenoid 21 to clear the signal and does so by traversing the following circuit, from coil 18 to condenser 19, to trolley-wire section in block Y, to trolley-pole, to condenser

23, to solenoid 21, to running-gear, by rails to coil 6, by connecting wire 8 to coil 7, to rail in block X back to coil 18. In making this circuit, the current from coil 18 will not short-circuit through the motor on account of the impedance 12. On the other hand the condenser 23 bars the power current from the signal or solenoid circuit but permits passage thereto of the signal current. Similarly the condensers 19 prevent the power current from short-circuiting to the rails from the trolley-wire sections.

From the foregoing, it will be clear how the signal in the car automatically clears or moves to danger depending on the presence of a car in the block ahead.

Having thus described my invention, what I claim is:—

1. In an alternating current signaling system, the combination of a trackway in block-sections, adapted each to be short-circuited across its rails without short-circuiting the other sections; a sectional conductor along the trackway; a transformer in each section of trackway, with one member connected across the tracks and receiving an alternating current supply, and with its other member delivering its current of induction to a signal device in a car through connections between said other transformer member and the trackway and the section behind of sectional conductor.

2. In an alternating current signaling system, the combination of a track-way in block-sections; a sectional conductor along the trackway; a transformer in each section of trackway receiving an alternating current supply and connected to be short-circuited by a car in its section of trackway, and having its secondary member connected with the trackway and section of sectional conductor behind to deliver its current to a signal device in a car on said trackway.

3. In combination a trackway in block-sections; a power-conductor along the trackway adapted to be continuous for direct and discontinuous for alternating current; a source of direct current supply connected across the power-conductor and the sections of trackway; a transformer in each block-section with one of its members connected to receive an alternating current but to be short-circuited by a car in its block, and having its other member delivering to the trackway and the section of power-conductor behind; and a signal in a car sensitive to alternating current and connected to derive such current from the power-conductor and the trackway.

4. In combination a trackway in block-sections, adapted each to be short-circuited across its rails without short-circuiting the other sections; a power-conductor in sections separated by impedance; a source of direct current supply connected across the power-conductor and the sections of trackway; a transformer in each block with its primary connected across the rails in its block and receiving an alternating-current supply, and with its secondary connected between the trackway and the section of power-conductor behind through a device impassable to direct current; and an alternating current signal carried by a car and connected to derive alternating current from the power-conductor and rails but to exclude the direct current.

5. In combination, a trackway in block-sections, adapted each to be short-circuited across its rails without short-circuiting the other sections; a power-conductor in sections separated by impedance; a source of direct current supply connected across the power-conductor and the sections of trackway; a coil in each block connected across a source of alternating current supply with one of the terminals of said coil in contact with a rail, said coil forming one member of a transformer, the other member of which is connected across the rails; a second transformer in each block comprising a coil connected across the rails of the block and further comprising a coil connecting, by a circuit adapted to carry only alternating currents, the trackway with the section behind of power-conductor; and signaling apparatus carried by a car and connected to operate from alternating current received between the power-conductor and the trackway.

6. In combination, a trackway in block sections, adapted each to be short-circuited across its rails without short-circuiting the other sections; a power-conductor in sections separated by impedance; two coils in each block connected across the rails, with adjacent coils of the different blocks connected; a source of direct current connected across the power-conductor and the sections of trackway; means adapted to impress an alternating current in the circuit consisting in each block of the rails and the aforesaid coils across them; and a secondary circuit adapted to be impressed with an induced current from the foregoing circuit and to deliver it to an alternating current signal in a car on the block behind.

7. In combination, a trackway in block-sections, adapted each to be short-circuited across its rails without short-circuiting the other sections; separated by impedance; two coils in each block connected across the rails with adjacent coils of the different blocks connected at middle points of their windings; a source of direct current connected across the power-conductor and the sections of track-way; means adapted to impress an alternating current in the circuit consisting in each block of the rails and the aforesaid coils across them; and a secondary circuit adapted to be impressed with an induced

current from the foregoing circuit and connected to the trackway and through a condenser to the section behind of power-conductor; and a signal carried by a car, connected to derive alternating current from the power-conductor and trackway but to exclude direct current.

8. In combination a trackway in block-sections adapted each to be short-circuited across in rails without short-circuiting the other sections; a power-conductor along the trackway adapted to be discontinuous for alternating current; a circuit connected across the rails in each block, adapted except when short-circuited, to impress an alternating current upon the power-conductor and trackway behind; and a signal carried by a car and connected to receive said alternating current from the power conductor and trackway.

9. In combination, a trackway in block-sections adapted each to be short-circuited across its rails without short-circuiting the other sections; a sectional conductor along the trackway; a circuit connected across the rails in each block, adapted when not short-circuited by a car in the block to impress a current upon the trackway and section of sectional conductor behind; and a signal carried by a car connected to receive said current from the sectional conductor and trackway.

In witness whereof, I have signed my name to the foregoing specification in the presence of two subscribing witnesses.

EDWARD E. KLEINSCHMIDT.

Witnesses:
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