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ELECTRICAL SIGNAL SYSTEM.

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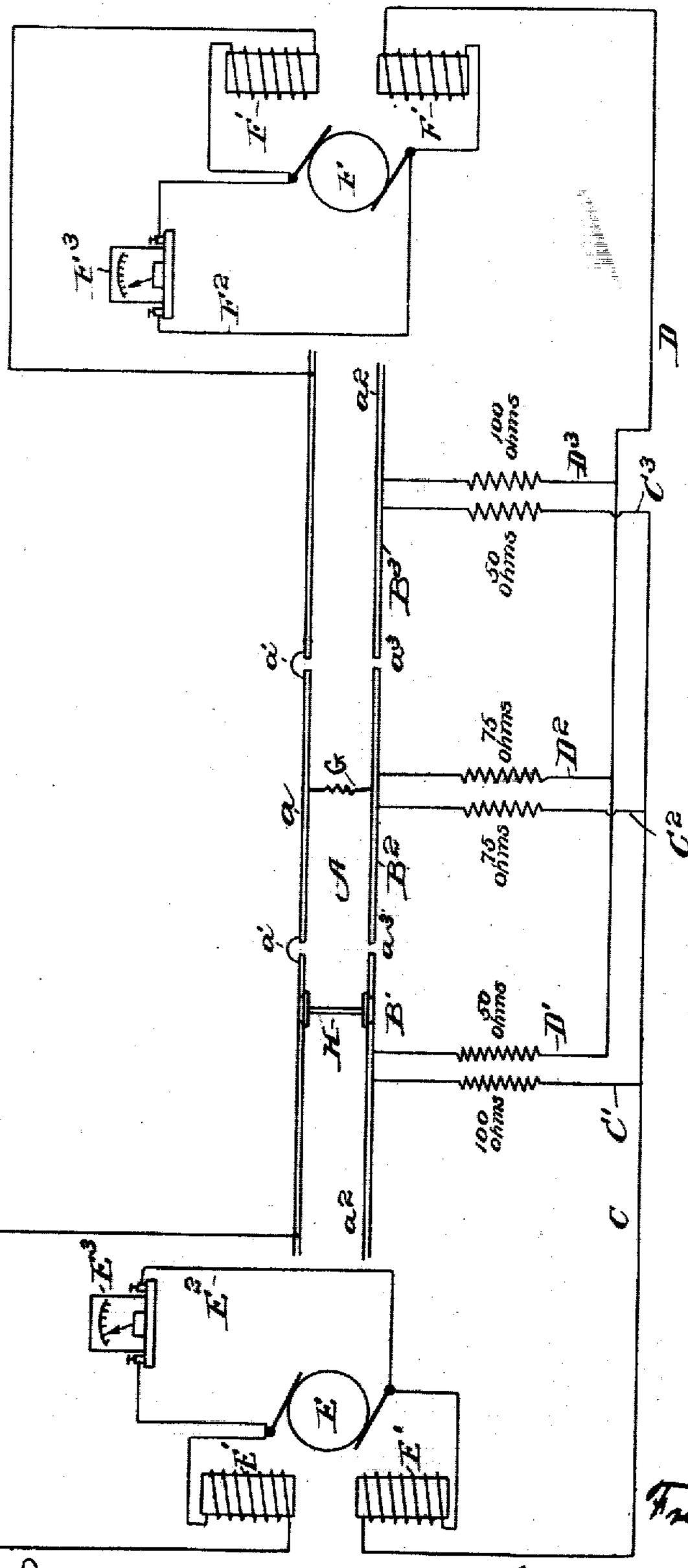

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ELECTRICAL SIGNAL SYSTEM.

No. 814,302. Specification of Letters Patent. Patented March 6, 1906.

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To all whom it may concern:

Be it known that I, FRED LACROIX, a citizen of the United States, and a resident of San Antonio, in the county of Bexar and State of Texas, have invented certain new and useful Improvements in Electrical Signal Systems, of which the following is a full, clear, and exact description, such as will enable those skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, forming a part of this specification.

The invention relates to improvements in electrical systems whereby the position of a train anywhere between the ends of a track can be ascertained at either terminal.

In carrying out the invention a normally open electrical circuit is provided which will be closed by a conductor, such as the wheels and axle of a locomotive, electrically connecting the two rails of the track. The circuit is divided into sections of different resistances, and at the terminals of the circuit are indicators, such as voltmeters, for determining the resistance offered by the circuit to the passage of the current. Each section of the circuit has a fixed resistance different from the resistances of any other section. When the circuit is completed through a particular section by the wheels and axle of a car or engine, by observing the indicator which registers the resistance of that particular section the location of the train can be determined from either end of the track.

The invention consists in the novel construction, combination, and arrangement of parts, such as will be hereinafter fully described, pointed out in the appended claims, and illustrated in the accompanying drawing.

The figure of the drawing is a diagrammatic view of an electrical signal system embodying the invention.

The railway-track A has one of its rails *a* electrically continuous from one end of the track to the other, the ends of the rail-sections being bonded in any suitable manner, as at *a'*. The other rail a^2 is divided by the insulating-breaks a^3 into sections or blocks B' B^2 B^3. Extending along the track are the electrical conductors C and D. The conductor C is connected at intervals with the sections or blocks B' B^2 B^3 by the resistance-coils C' C^2 C^3, respectively, and the conductor D is also connected with the said blocks or sections by the resistance-coils D' D^2 D^3, respectively. Each one of the sections or blocks B' B^2 B^3, through its respective coil C', C^2, or C^3, has a fixed resistance when the circuit is completed through such section and the conductor C, which resistance is different from the resistances of the other sections connected with such conductor. For an instance, the resistance of the section B' through the conductor C to the left end of the system may be one hundred ohms, of the section B^2 seventy-five ohms, and the section B^3 fifty ohms. Also each one of the sections or blocks B' B^2 B^3, through its respective coil D', D^2, or D^3, has a fixed resistance when the circuit is completed through the conductor D, which resistance is different from the resistances of the other sections connected with the conductor D. For an instance, the resistance of the section B' through the conductor D to the right of the system may be fifty ohms, of the section B^2 seventy-five ohms, and the section B^3 one hundred ohms. It is to be noted that the variations in the resistances of the members as they are grouped on either conductor C or D is considerable to allow for any minor changes in the different resistances that may be brought about by weather conditions and other causes. The different resistances of the several sections may be established by any of the well-known methods of calibration.

At the opposite ends of the track A are the shunt-wound dynamos E and F, respectively. In circuit with the shunt or field coil E' of the dynamo E are the rail A and the conductor C, and in circuit with the shunt or field coil F' of the dynamo F are the rail *a* and the conductor D. An electric bridge G connects the rail *a* with the rail a^2. Through the rails *a* a^2 the bridge G, the conductors C D, and the resistance-coils C' C^2 C^3 and D' D^2 D^3 the shunt or field coils of the two dynamos are connected in series, so as to form one long shunt across the entire circuit. The electric bridge G forms a connection between the rails *a* and a^2, so that the circuit of the field-coils of the dynamos will always be closed. The resistance of the bridge is such, however, that but little current would pass through the same should the wheels and axle of a car make the connection between the two rails.

Interposed in the main circuits E^2 and F^2 of the dynamos E and F, respectively, are the

voltmeters E^3 and F^3, respectively. As the field or shunt coil E′ of the dynamo E is connected with the conductor C, the voltmeter E^3 will indicate the resistance offered to any current that may pass through any one of the sections or blocks connected with said conductor C should a section or block be electrically connected with the rail *a*. Likewise the voltmeter F^3 would indicate the resistance offered to any current that might pass through any one of the blocks or sections connected with the conductor D. As the resistance of each section on either conductor is known, the particular section that may be in electrical connection with the rail *a* can be ascertained by observing the resistance indicated by either voltmeter. Owing to the completion of the circuit by the bridge G, there will be a constant flow of the current at a low voltage through the circuit when there are no cars on the track. This will cause a slight deflection of the needles of the voltmeters at the ends of the circuit, and consequently it can always be determined if the circuit is in working order. The point at which the needles stand under such conditions can be made the zero-point of the voltmeters. Should the needles drop below that point, they would indicate that the circuit had been broken.

The operation of the system is as follows: As shown in the drawing, the wheels and axle H are on the section B′ and form an electrical connection between the rails *a* and a^2. The current from the dynamo E will pass from the conductor C, through the coil C′, the rail a^2, the wheels and axle H, the rail *a*, and back to the dynamo. As the resistance of the section B′ through the conductor C and the intermediate connections is one hundred ohms, the voltmeter E^3 measuring such a resistance will indicate to the observer at the left-hand terminal of the track that the train is on the said section B′. Likewise with the voltmeter F^3 the observer at the right-hand terminal can also ascertain the position of the train. With the wheels and axle H electrically connecting the rails *a* and a^2 at section B the current from the dynamo F and the rail *a* will pass through the wheels and axle to the rail a^2, thence through the coil D′ and the conductor D to the dynamo. The resistance of the section B′ through the conductor D and the intermediate connections with the dynamo F is fifty ohms. The voltmeter F^3 showing such a measurement will indicate to the observer at the right-hand terminal that the train is on section B′. In this manner the position of the train on any other one of the sections can be ascertained.

While the hereinbefore-described embodiment of the invention is the preferred one, yet it can be departed from to a considerable extent without departing from the spirit of the invention.

Having described my invention, I claim—

1. In an electrical signal system, a railway-track, a source of electricity, a circuit connected with said source of electricity and extending along said track, bridging-coils interposed at intervals in said circuit to divide the same into blocks of different electrical resistances, means movable along said track and operating to close said circuit through said blocks, and resistance-indicating mechanism operated by a current passing through said circuit.

2. In an electrical signal system, a railway-track, a source of electricity at each end of said track, a circuit common to both sources of electricity and extending along said track, bridging-coils interposed at intervals in said circuit to divide the same into blocks of different electric resistances, means movable along said track and operating to close said circuit through said blocks, and a resistance-indicating mechanism at each end of said track and operated by a current passing through said circuit.

3. In an electrical signal system, a railway-track with one of its rails electrically continuous and the other one divided by insulating-breaks into blocks, a source of electricity connected with said continuous rail, a conductor extending along said track and connected with said source of electricity, bridging-coils connecting said conductor with the blocks of the divided rail to form blocks of different electrical resistances, means movable along said track and operating to complete the circuit between said rails, and a resistance-indicating mechanism operated by the current passing through the completed circuit.

4. In an electrical signal system, a railway-track with one of its rails electrically continuous and the other one divided by insulating-breaks into sections, a source of electricity at each end of said track and connected with said continuous rail, separate conductors extending along said track and respectively connected with each source of electricity, bridging-coils connecting the sections of said divided rail with said conductors to form blocks of different electrical resistances, means movable along said track and operating to electrically connect said rails to complete the circuits through said conductors, and a resistance-indicating mechanism operated by the current passing through each of the completed circuits.

5. In an electrical signal system, a railway-track, a dynamo, a circuit connected with said dynamo and extending along said track, bridging-coils interposed at intervals in said circuit to divide the same into blocks of different electrical resistances, means movable along said track and operating to close said circuit through said blocks, and a resistance-indicating mechanism connected with said dynamo.

6. In an electrical signal system, a railway-track with one of its rails electrically continuous and the other one divided by insulating-breaks into sections, a dynamo with its field-coil connected with said continuous rail, a conductor extending along said track and connected with the field-coil of said dynamo, bridging-coils connecting said conductor with said divided rail to form blocks of different resistances, means movable on said track and operating to complete the circuit, and a resistance-indicating mechanism connected with the main circuit of said dynamo.

7. In an electrical signal system, a railway-track with one of its rails electrically continuous and the other one divided by insulating-breaks into sections, a dynamo at each end of said track with its field-coil connected with said electrically-continuous rail, separate conductors respectively connected with the field-coil of each dynamo and extending along said track, bridging-coils connecting each of the sections of said divided rail with both conductors to form blocks of different electrical resistances, means movable along said track and operating to complete both circuits, and resistance-indicating mechanisms respectively connected with the main circuit of each dynamo.

8. In an electrical signal system, a railway-track, dynamos at opposite ends of said track and having a circuit common to both, bridging-coils interposed in said circuit to form blocks of different resistances, means movable on said track and operating to close said circuit through said blocks, and a resistance-indicating mechanism connected with each of said dynamos.

9. In an electrical signal system, a railway-track, shunt-wound dynamos at opposite ends of said track and having their shunt-coils connected in series and extending across the entire circuit, bridging-coils interposed in the circuit formed by the connection between the shunt-coils of the dynamos and forming blocks of different resistances, means movable on said track and operating to close said shunt-circuit through said blocks, and a resistance-indicating mechanism operated by the current passing through the main circuit of each dynamo.

10. In an electrical signal system, a railway-track, a source of electricity, a circuit connected with said source of electricity and extending along said track, means for dividing said circuit into blocks of different electrical resistances, means movable along said track and operating to close said circuit through said blocks, and resistance-indicating mechanism operated by a current passing through said circuit.

11. In an electrical signal system, a railway-track, a shunt-wound dynamo, a circuit connected with the shunt-coil of said dynamo and extending along said track, means for dividing said circuit into blocks of different electrical resistances, means movable on said track and operating to close said circuit through said blocks, and resistance-indicating mechanism operated by the current passing through the main circuit of said dynamo.

12. In an electrical signal system, a railway-track, a shunt-wound dynamo, a circuit connected with the shunt-coil of said dynamo and extending along said track, means movable on said track and operating to short-circuit said circuit, and resistance-indicating mechanism operated by the current passing through the main circuit of said dynamo.

13. In an electrical signal system, a railway-track, a source of electricity, a circuit connected with said source of electricity extending along said track and adapted to be short-circuited by an obstruction on said track, means for dividing said circuit into blocks of different electrical resistances, and resistance-indicating mechanism operated by a current passing through said circuit.

14. In an electrical signal system, a railway-track, a shunt-wound dynamo, a circuit extending along said track and adapted to be short-circuited by an obstruction on said track and connected with the shunt-coil of said dynamo, and resistance-indicating mechanism operated by the current passing through the main circuit of said dynamo.

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

FRED LACROIX.

Witnesses:
CHAS. F. A. HUMMEL,
JOHN U. MUELLER.