

No. 649,989.

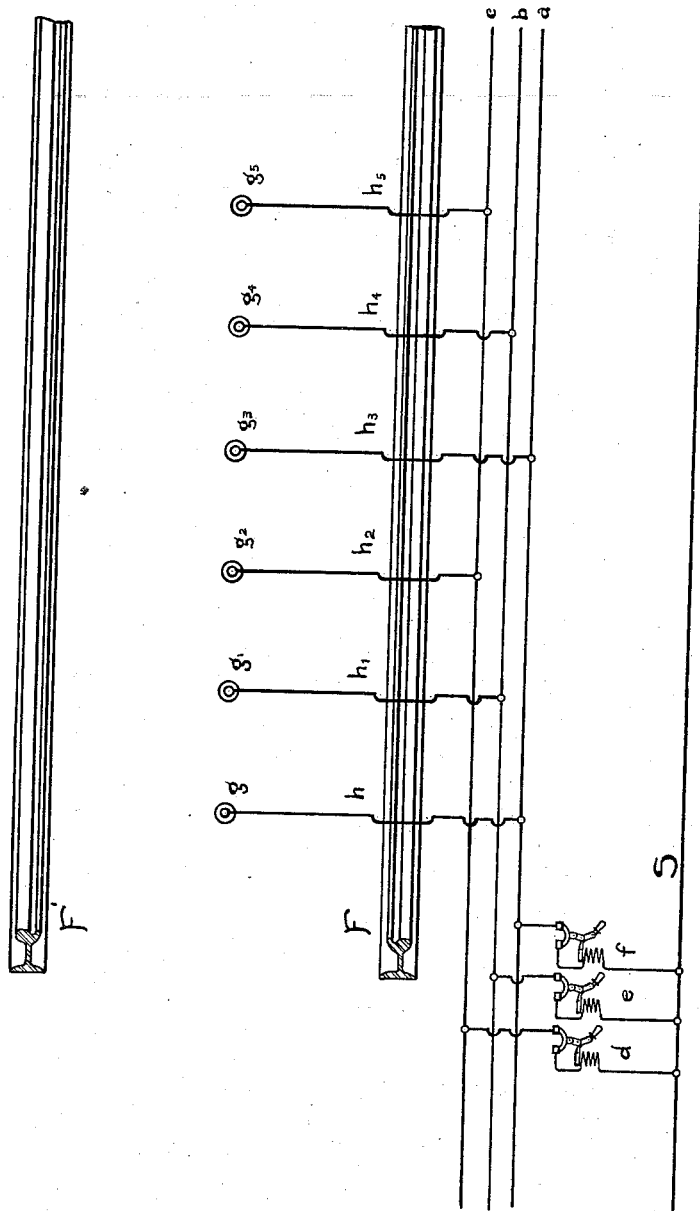
Patented May 22, 1900.

F. R. KOSS.

SYSTEM OF ELECTRICAL DISTRIBUTION FOR ELECTRIC RAILWAYS.

(Application filed Mar. 8, 1900.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

FEDOR R. KOSS, OF CHARLOTTENBURG, GERMANY.

SYSTEM OF ELECTRICAL DISTRIBUTION FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 649,989, dated May 22, 1900.

Application filed March 8, 1900. Serial No. 7,789. (No model.)

To all whom it may concern:

Be it known that I, FEDOR R. KOSS, a subject of the Emperor of Germany, residing at Charlottenburg, near Berlin, Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Systems of Electrical Distribution, (Case No. 1,554,) of which the following is a specification.

This invention relates to a system of distribution having especial application to electric railways.

The drawing is a plan view of a system embodying my invention.

The rails of an electric railroad are represented by the letters F and F'. In any suitable location, such that they may be engaged by the collectors on the car, are arranged electrical contacts *g g'*, &c. These contacts may be classified as sets, each set being connected or adapted to be connected with one of the auxiliary supply-conductors *a b c*. These conductors *a b c* are each connected by independent conductors with the main feeder of the system through circuit-breakers *d e f*. The contacts *g*, &c., with their connections, are so arranged that two successive contacts are never connected to the same supply-conductor—that is, so that each contact is connected or adapted to be connected with a supply-conductor other than that or those with which the preceding and subsequent conductors are connected.

Hitherto electric railways with overhead supply-lines have been divided into sections for convenience in repairing defects which could be quickly accomplished; but this method is inapplicable to railways, such as surface-contact or conduit railways, wherein underground constructors are used, owing to the greater length of time necessary for repairs. In a system constructed in accordance with my invention when any contact is short-circuited the circuit-breaker in the connection between the feeder and the auxiliary conductor with which the contact is connected will open and prevent a further waste of current. The circuit-breakers *d e f* are of any suitable design of the many known to engineers for accomplishing the desired result. As shown in the drawing, there is a coil in series with the switch-contacts, so that when the corresponding working contact *g* is short-circuited, causing excessive current to flow

through the switch and coil, the coil will cause the switch to open. The switch of each circuit-breaker is adapted to be operated manually, when desired, as shown. This, however, will not cause a suspension of the operation of the cars on the road, for the contacts connected with the other supply-conductors are still operative, and the momentum of a car will carry it over the dead contact. In case of a road running through a street with heavy traffic if the momentum of a car be not sufficient to carry it over the dead contact or if the contacts are separated so far from each other that a car may stop on a dead contact without any connection with a live contact such car can readily be pushed along to a live contact by the following car. The supply-conductors to which the short-circuited contact is connected being now cut out, that contact can be readily located by testing and repairs made without interrupting traffic. If desired, the contacts may be arranged so closely together or the collector on the car be of such length that two contacts may always be engaged simultaneously by the collector, and in this case no single car could be stalled even though one of the contacts be dead. Likewise in case of damage to any contact or a break in its connections the corresponding circuit-breaker or switch can be opened and repairs made while the defective contact is cut out. If desired, the contacts may have numbers cast on them for convenience in locating defects. The combination of switches and fuses is regarded as an equivalent of the circuit-breakers.

The auxiliary supply-conductors *a b c* may extend the entire length of the road and the circuit-breakers be located in the station, thus avoiding the use of the feeder S, or the feeder S may be used and the circuit-breakers located at the most convenient part of the line other than the station; but for long roads it is preferred to use the feeder S, as shown, with the auxiliary conductors *a b c* in sections, each conductor of a section being connected with the feeder S through a circuit-breaker.

The invention is not limited in its application to any particular form of electric railway, but may be applied to an underground railway with overhead contacts, a conduit-railway, or surface-contact railway without de-

parting in any essential respect from the spirit of the invention. The contacts are shown herein as permanently connected with the supply-conductors; but the invention is intended to be applied to sectional railways in which the contacts are normally dead, but are energized at the passing of a car in any suitable manner. Contact-rails might also be used instead of the studs, as shown. It is not essential that three auxiliary supply-conductors, as shown, be used, as two would be sufficient in practice, or any greater number could be used. It is only necessary that more than one be used in order that each contact may be connected with a different conductor than that with which the nearest contacts to it are connected.

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

1. A main supply-conductor, a plurality of auxiliary supply-conductors connected therewith, and sets of contacts, the number of sets corresponding to the number of auxiliary conductors, the contacts of each set being electrically connected with one of the auxiliary supply-conductors, and each contact of any set being arranged alternately with the contacts of another set or sets.

2. A main supply-conductor, a plurality of auxiliary supply-conductors connected therewith, and sets of contacts, the number of sets corresponding to the number of auxiliary conductors, the contacts of each set being electrically connected with one of the auxiliary supply-conductors, and each contact of any set being arranged alternately with the contacts of another set or sets, and means for disconnecting any of the auxiliary conductors from the main supply-conductor.

3. A main supply-conductor, a plurality of auxiliary supply-conductors connected therewith, and sets of contacts, the number of sets corresponding to the number of auxiliary conductors, the contacts of each set being electrically connected with one of the auxiliary supply-conductors, and each contact of any set being arranged alternately with the contacts of another set or sets, and means whereby an auxiliary conductor is automatically disconnected from the main conductor when any of the contacts connected with said auxiliary conductor is short-circuited.

4. In an electric railway, the combination with the main feeder, of a plurality of supply-conductors electrically connected with the feeder, and sets of contacts all arranged along the way and adapted to be engaged by the collector of the car, the contacts of each set being adapted to be connected with one of said auxiliary supply-conductors, and each contact in all the sets being arranged between the contacts of another set or sets.

5. In an electric railway, the combination with the main feeder, of a plurality of supply-conductors electrically connected with the feeder, and sets of contacts all arranged along the way and adapted to be engaged by

the collector of the car, the contacts of each set being adapted to be connected with one of said auxiliary supply-conductors, each contact in all the sets being arranged between the contacts of another set or sets, and means for disconnecting any of the auxiliary conductors from the main supply-conductor.

6. In an electric railway, the combination with the main feeder, of a plurality of supply-conductors electrically connected with the feeder, and sets of contacts all arranged along the way and adapted to be engaged by the collector of the car, the contacts of each set being adapted to be connected with one of said auxiliary supply-conductors, each contact in all the sets being arranged between the contacts of another set or sets, and means whereby an auxiliary conductor is automatically disconnected from the main conductor when any of the contacts connected with said auxiliary conductor are short-circuited.

7. In an electric railway, the combination with the main feeder, of a plurality of supply-conductors electrically connected with the feeder, and sets of contacts all arranged along the way and adapted to be engaged by the collector of the car, the contacts of each set being adapted to be connected with one of said auxiliary supply-conductors, each contact in all the sets being arranged between the contacts of another set or sets, and a circuit-breaker in each connection between the main conductor and the auxiliary conductors.

8. In an electric railway, the combination with a plurality of supply-conductors, of contacts adapted to be engaged by the collector on the car, each contact being adapted to be connected with a supply-conductor other than that or those with which the two contacts between which it is located are connected.

9. A main supply-conductor, sections of auxiliary supply-conductors, each section comprising a plurality of conductors, each conductor of each section being connected with the main supply-conductor, and sets of contacts, the contacts of each set being adapted to be connected with one series of conductors extending throughout all the sections, and the contacts being located so that no two adjacent contacts are connected with the same auxiliary conductor.

10. In an electric railway, the combination with sets of contacts adapted to be engaged by the collector on the car, each contact being adapted to be connected with a feeder other than that or those to which the contacts adjacent to it are connected, and means for disconnecting a conductor from the set of contacts which are connected with it when there is any trouble with any of the contacts in that set.

In witness whereof I have hereunto set my hand this 20th day of February, 1900.

FEDOR R. KOSS.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.