(No Model.) 2 Sheets—Sheet 1.

D. E. KIMBALL.

ELECTRIC RAILWAY.

No. 489,563. Patented Jan. 10, 1893.

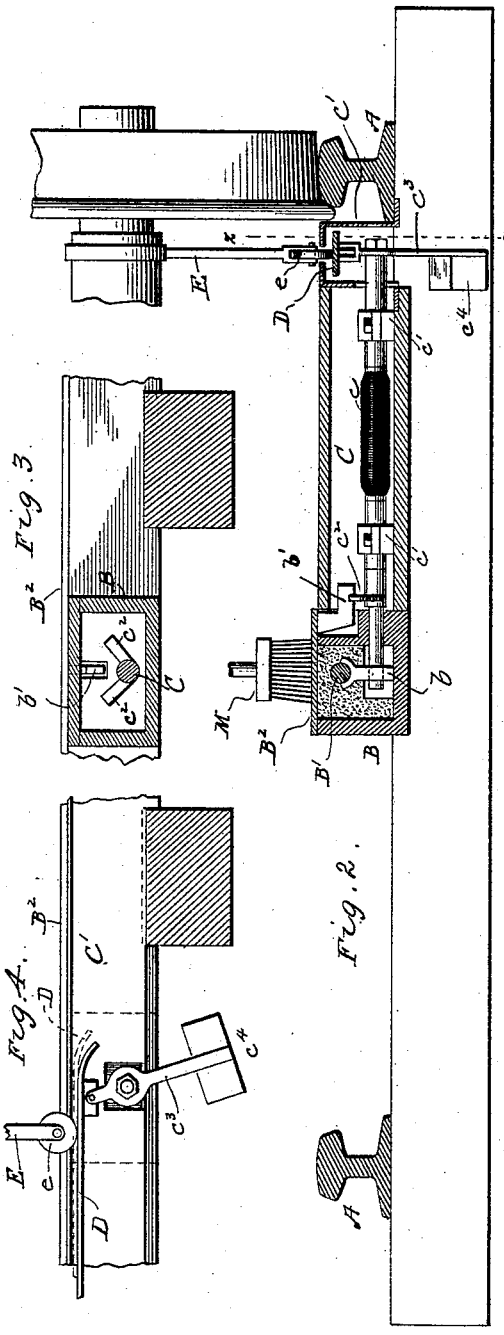

Fig. 2.

Fig. 4.

Fig. 3.

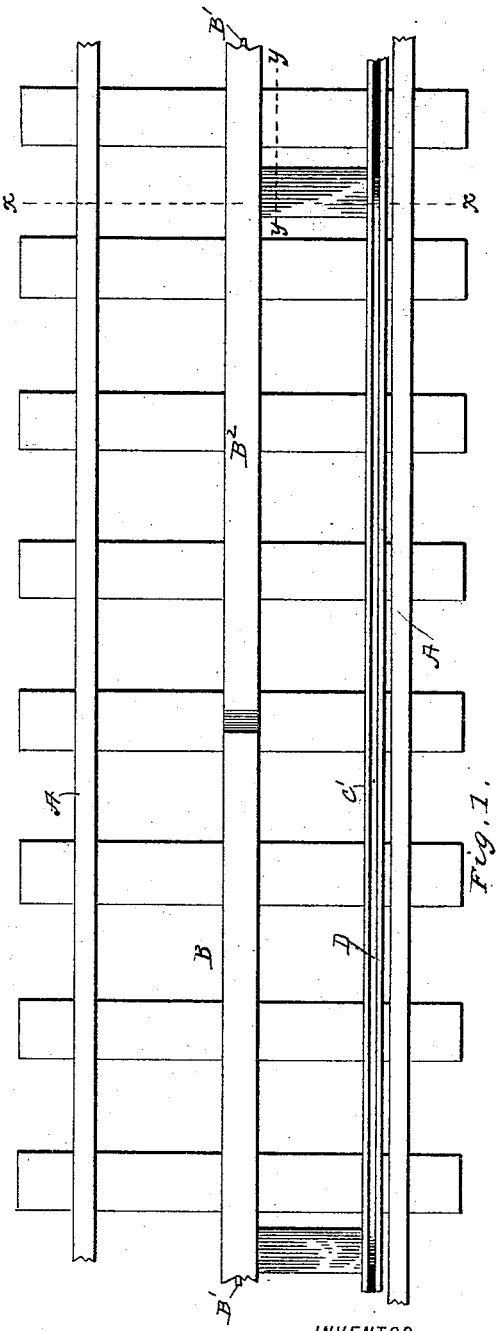

Fig. 1.

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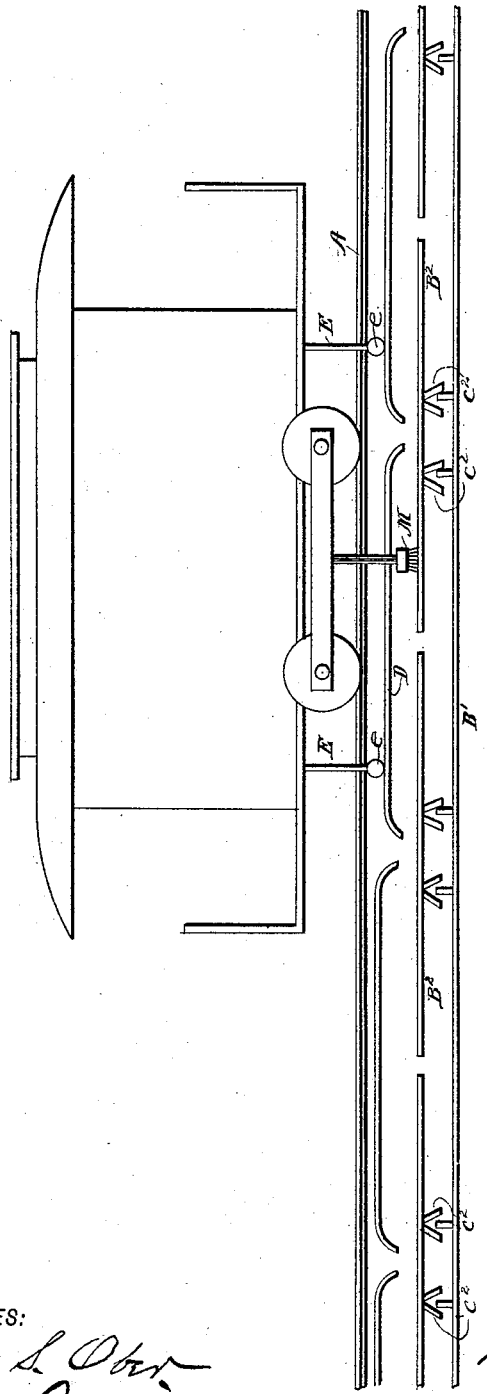

Fig. 5.

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UNITED STATES PATENT OFFICE.

DANIEL EDSON KIMBALL, OF TOPEKA, KANSAS.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 489,563, dated January 10, 1893.

Application filed January 11, 1892. Serial No. 417,657. (No model.)

To all whom it may concern:

Be it known that I, DANIEL EDSON KIMBALL, a citizen of the United States, residing in Topeka, county of Shawnee, and State of Kansas, have invented certain new and useful Improvements in Electrical Railways, of which the following is a specification.

My invention relates to electrical railways and has particular reference to those systems in which the conductor supplying current to the vehicles is located beneath the car, either in a conduit or upon the surface of the road-bed.

The object is to provide a system in which there will be no exposed live conductors along the road-way, except at points immediately adjacent to the vehicle. This broad idea I understand to be old, but my invention consists in the special mechanism for accomplishing that object in a most efficient and simple manner.

The invention will be specifically described and pointed out in the claims which follow.

In the accompanying drawings, Figure 1 represents the plan of the road-way; Fig. 2 a transverse section of the same taken on line *x*, *x*, of Fig. 1. This figure also shows a portion of the vehicle; Fig. 3 is a section taken on line *y*, *y*, of Fig. 1; and Fig. 4 is a section taken on line *z*, *z*, of Fig. 2. Fig. 5 is a conventional view of the car and portions connected with the road bed.

A A represent the two rails of the track upon which the vehicles run. Midway between these rails there is located a continuous box B which may be sunk in the ground flush with the surface, or resting upon the same. Through the middle of this box a continuous electric conductor B′ is led and thoroughly insulated by being embedded in insulating material or in any other approved way. This conductor is not directly exposed at any point, but at intervals it is provided with metallic offsets *b* against which the inner end of rock shafts C bear. Along the upper surface of the conduit B is placed a sectional conductor B^2 in the form of a flat strip, as shown. The sections are separated and insulated from each other and present a flat surface over which a contact device, represented by M, may slide and convey current therefrom to the vehicle. Each section of this conductor has a circuit maker and breaker, which consists of a rock shaft C, before mentioned. This shaft, as before stated is in constant connection with the main conductor B′. It extends transversely across the road-bed from the conductor B′ to a point near one of the rails. Its outer end is insulated from its inner end by an interposed length of insulating material *c*; the bearings *c′ c′* of the shaft are located near the ends and the inner end is equipped with two radial wings c^2 c^2 standing at opposite angles. Directly above the wings there is a projection *b′* from the sectional conductor B^2 which stands in the path of movement of said wings so that when the latter are swung around by the movement of the shaft one of them will make contact with the projection *b′* and establish an electrical connection between the main B′ and a strip of the sectional conductor B^2.

The outer end of shaft C projects into a conduit C′ formed just inside of one rail A and parallel to it, where it is fitted with a cross-bar c^3, the lower end of which carries a weight c^4 and the upper end is pivotally attached to a bar D. This bar extends through the conduit C′ and is about equal in length to one of the sections of conductor B^2, but it extends from the middle of one of said sections to the middle of the next, at which points the shafts C are located; the ends of the bar are curved downward slightly as shown. The normal position of the bar D is up close to the slot in the conduit where it is held by the weights c^4 which tend to maintain the cross-bars c^3 in vertical positions.

The collector M is mounted upon the car at about midway of its ends and near each end of the car is fixed an arm E carrying a roller *e* at its lower end which projects into the conduit C′ a little past the plane of the bars D. As the car proceeds along the road-way the first roller *e*, strikes the curved ends of a bar, forces it forward and downward and then rides along its upper surface. Before it reaches the other end the rear roller *e* passes upon the bar and continues to hold it down after the first has passed on to the next bar. The bar in making this forward and downward movement causes the two shafts C connected with it to rock and bring one of the wings c^2 on each into contact with their re-

spective projections b' on the sectional conductor, thereby supplying the two sections of conductor beneath the car with current which is conveyed to the motor on the car through the collecting device M. When both rollers *e e* have passed off a bar D, gravity acting upon weights c^4 swings the bar up to its normal position and breaks the circuit of the sectional conductor.

The rock shafts will be suitably housed in boxes as shown or in any other desired manner to protect them from the weather. I do not confine myself to any particular construction of either conduit, nor to the construction of the sectional conductor. Two wings c^2 are provided in order that the vehicles may run in both directions on the same track.

Having thus described my invention, I claim:

1. In an electric railway, the combination of a continuous insulated conductor, a bare sectional conductor, a series of rock shafts arranged at right angles to the continuous conductor, said rock shafts being directly connected at one end with the continuous conductor and the other end projecting into a conduit, a crank arm on the end in the conduit, a circuit closing arm carried by the rock shaft and adapted to make direct connection with the sectional conductor and a device carried by the vehicles for turning the crank on the rock shaft for the purpose set forth.

2. In an electric railway, the combination of the main and sectional conductors, a series of rock shafts and switches between the main and sectional conductors operated by the rock shafts, cranks on the ends of the rock shafts, the cranks on the successive pairs of rock shafts being joined by a bar pivoted thereto and a device carried by the vehicles co-operating with the bar to close said switches.

3. In an electric railway the combination of a plurality of rock shafts controlling circuit makers and breakers, a weighted cross-head on each rock shaft, bars, as D, pivotally connected respectively with the successive pairs of cross-heads, a device carried by the vehicles arranged to move said bar thereby rocking the shafts and operating the circuit makers and breakers.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

DANIEL EDSON KIMBALL.

Witnesses:
CHARLES MCCLINTOCK,
H. E. BLOUNT.