(No Model.) 2 Sheets—Sheet 1.

G. H. BENJAMIN.

CONDUCTOR SWITCH.

No. 526,850. Patented Oct. 2, 1894.

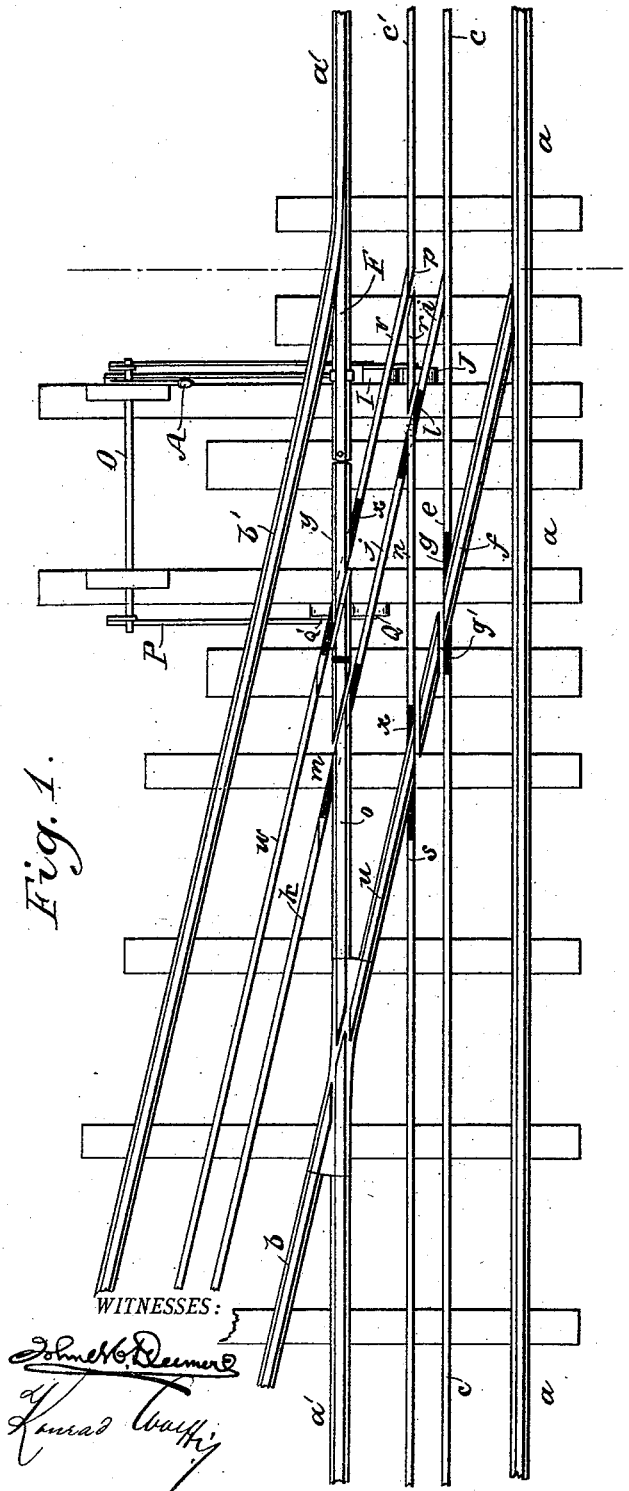

Fig. 1.

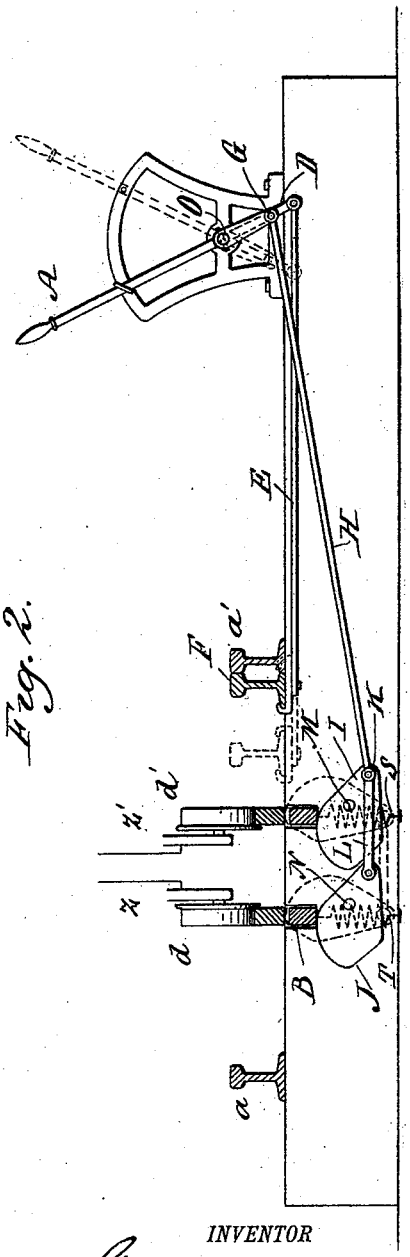

Fig. 2.

WITNESSES:

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Konrad Wappi

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Geo. H. Benjamin

(No Model.) 2 Sheets—Sheet 2.

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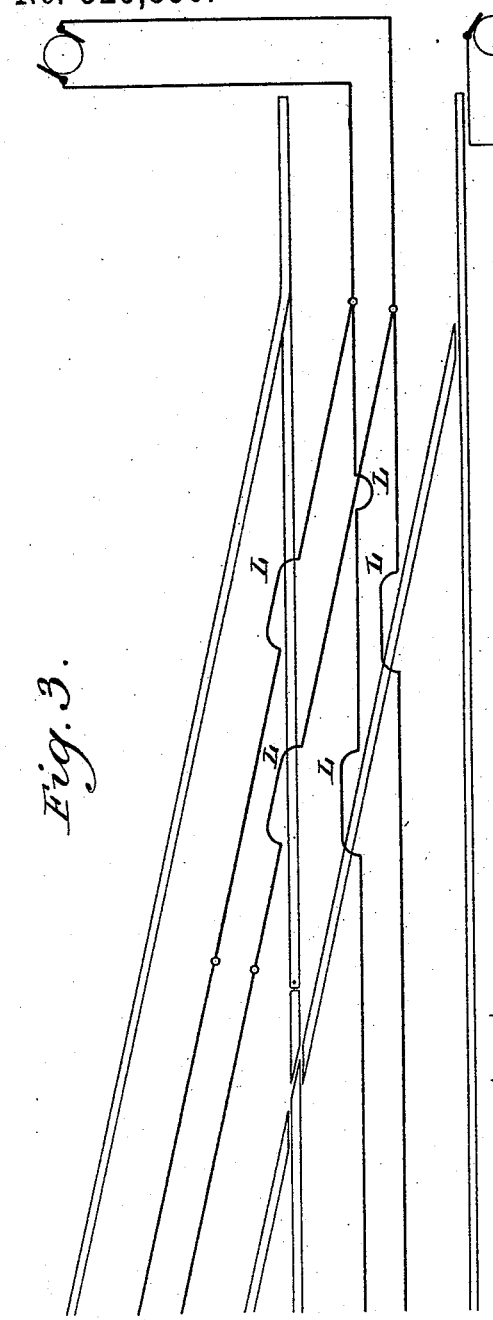

Fig. 3.

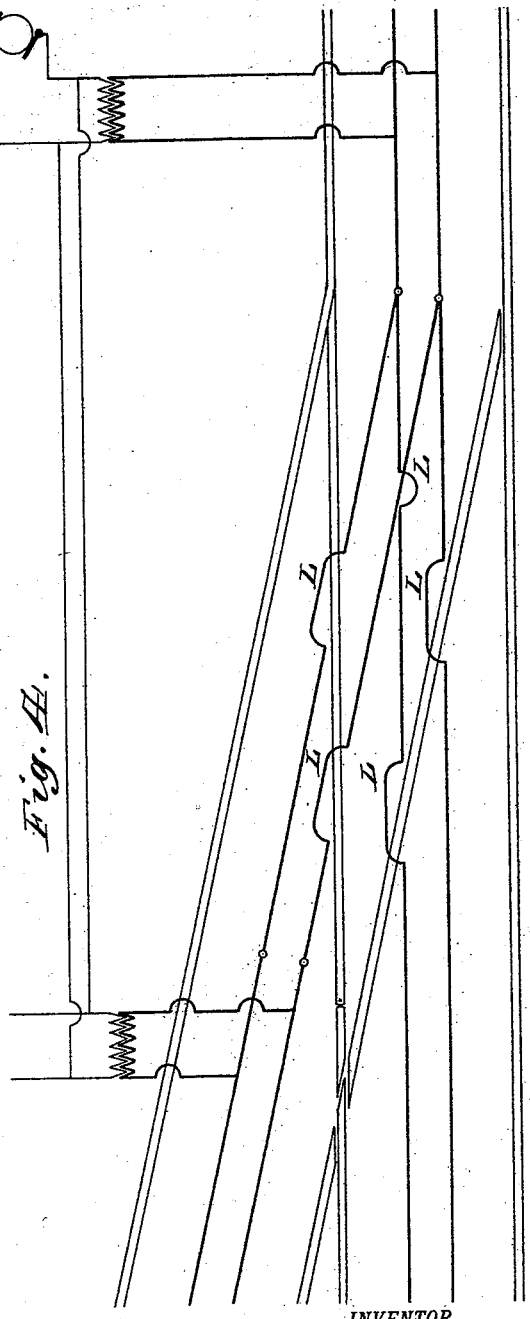

Fig. 4.

WITNESSES:

John H. Benjamin

Konrad Koch

INVENTOR

Geo. H. Benjamin

UNITED STATES PATENT OFFICE.

GEORGE H. BENJAMIN, OF NEW YORK, N. Y., ASSIGNOR TO THE FIRM OF SIEMENS & HALSKE, OF BERLIN, GERMANY.

CONDUCTOR-SWITCH.

SPECIFICATION forming part of Letters Patent No. 526,850, dated October 2, 1894.

Application filed September 28, 1893. Serial No. 486,653. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. BENJAMIN, a citizen of the United States, residing at the city of New York, in the county and State of New York, have invented new and useful Improvements in Conductor-Switches, of which the following is a specification.

My invention relates to electric railways in general and particularly to a conductor switch therefor, and has for its object to provide such an arrangement and construction of the parts thereof as shall render it readily operative and shall overcome the liability of the collector to leave the working conductor when the supporting vehicle is switched from one track to another, especially at times of great speed.

With these objects in view it consists in providing the working conductors; which in this case are centrally disposed contact rails mounted on insulating supports, with removable crossing sections; and in the arrangement of operating apparatus therefor, as is shown in the accompanying drawings and will be hereinafter set forth.

In the drawings forming a part of this specification, Figure 1 is a plan view of a portion of a main track and siding, showing the location and arrangement of the working conductors, their movable portions and operating means. Fig. 2 is a detail view of the switch operating mechanism, the main and side tracks and the movable portions of the working conductors being shown in section. Fig. 3 is a representation of a system embracing my invention and in which direct current is supplied to the motors on the vehicles through the conductors and contact devices. Fig. 4 is a view similar to that shown in Fig. 3, and in which a converter system is shown as applied to a railway system embodying my invention.

Referring now to the drawings, a, a' represent the rails of a main track provided with a siding, indicated by the letters b, b' which is provided with the usual switch rails and frogs, with the modifications as will be presently explained.

As working conductors, I prefer to employ rails c, c' having suitable insulating supports of such disposition and height as to elevate the contact rail so as to be borne against by suitable collectors d, d' arranged in the desired manner and location on the motor car. Such contact devices may be of any desired form and construction and provided with suitable means, such as springs to retain them in constant contact with the working conductors.

The conductor section c, which in Fig. 1 of the drawings is shown farthest from the siding, is made continuous until it reaches the point e, when it is divided for the passage of the rail section f. Suitable insulating material g g' is arranged on either side of the said rail section to prevent grounding of the current in the passage of the collector over the rail f, said insulating material being of greater longitudinal extent than the bearing portion of the contact device. The usual loops L are used in this as well as in the several similar crossings hereinafter mentioned to preserve the continuity of the circuit.

Extending from point h of conductor c and at the proper angle thereto, is a branch conductor consisting of sections i j k divided bodily, relatively to each other, by insulating material l m, said sections having electrical connections through the medium of loops as above mentioned. The insulation l separates sections i and j of conductor c and forms a chair for the section n of conductor c' which is embedded therein, while insulation m performs an office similar to that of g g', in that it prevents grounding of the current from k or j through section o of track rail a'.

Working conductor c' is divided by means of a gap at point p, into the successive sections r n and s thereof, with which electrical connection is maintained however through suitable flexible loops. Section n is separated from section s by means of insulating material x, the object of which is to prevent grounding through rail section u. Said sections are in electrical connection however through flexible conductors. Extending from point p of conductor c' is a side conductor

section v conforming with the direction of the switch rails, and separated from section w by means of insulating material x forming means for preventing short circuiting through rail section y in a manner as in similar instances heretofore mentioned. Both main conductors c and c' are in constant electrical connection with their respective several branches and sections through loops.

In the operation of my invention it is necessary that the conductor sections v, i and j be removed from contact with the collector of a passing vehicle when the main track is open for traffic. In order to accomplish this, I employ the mechanism shown in Fig. 2, which is operated by means of and simultaneously with the usual switching lever A. The sections to be removed are provided with suitable ways B in which they may be shifted vertically in accordance with the established working of the system.

To the working end D of the switch lever A, which lever is of the usual construction, is attached the customary shifting rod E connected to the shift rail F. Pivoted to said lever at a point G above the rod E is a second shift rod H for operating the conductor sections and having connections with the eccentrics I and J in the manner shown in Fig. 2 of the drawings, said connections consisting of a common pivot K acting to connect rod H to the point of the eccentric I and also to the short lever L having pivotal connection with the point of the eccentric J. The said eccentrics are arranged to turn on suitably disposed pivots M and N and are located below their respective ways B to move their conductor sections in a vertical direction.

In the place of the usual short pivot o of the switch lever A, I prefer to use a bell-crank lever O having a shifting rod P pivoted thereto to operate eccentrics Q and Q' arranged below and in such position as to raise or lower the conductor sections j and x similarly to the hereinbefore described manner, as the switch is opened or closed. While it is evident that in this construction the conductor sections v x and i j, respectively, must be connected, it is not necessary that such sections be so connected if another construction be used for raising and lowering them, in which the different sections of the conductor are substantially rigidly secured to the connecting rods or other moving mechanism. In practice, of course, it will be found that, if the sections are respectively connected in line, the operation of moving them will be more perfect.

Having now described the arrangement of the several parts of my invention, I will set forth its operation, which is as follows:

Referring to Fig. 1 of the drawings, when the track is clear, as shown, the switch lever A is in the position indicated in Fig. 2, at which time the points of the eccentrics being drawn, they are caused to lie in a lowered position and their respective conductor sections are lowered, due to gravity and the retractile auxiliary springs S T. It will thus be seen that the collector will follow the main conductor and will conform with the direction of the main track, inasmuch as the rolling contacts of said collectors are provided with interiorly arranged flanges z z' shown in Fig. 2, which prevent the collectors leaving the rails and hence insure constant electrical connection. When the switch is thrown open, simultaneously with the movement thereof due to the operation of the lever A, the eccentrics are rocked and the conductor sections v, i, j, are raised, when they form means of electrical supply to the collectors which will be thrown thereonto, due to the positive bearing of sections v and i against the mains c' c respectively. It will thus be seen that it is impossible for the collectors to take the main conductors when the switch is open or vice versa, a defect in operation which has been of much annoyance in the use of conductor systems as heretofore constructed.

I do not limit myself to the use of any particular character of current, as I may distribute directly, or through transformers, as indicated in Fig. 4 of the drawings.

Having now described my invention and its manner of operation, what I claim is—

1. In an electric railway, the combination with a main track and an adjoining switch track; of working conductors for each of said tracks, one of said tracks having a sectional conductor normally out of the plane of the conductor of the other track, but adapted to be brought into line with the adjacent sections of the conductor of its own track and close the gap therebetween.

2. In an electric railway, the combination with a main track and an adjoining switch track; of working conductors for each of said tracks, one of said tracks having a vertically movable sectional conductor normally out of the plane of the conductor of the other track, but adapted to be brought into line with the adjacent sections of the conductor of its own track and close the gap therebetween.

3. In an electric railway the combination with a main track and an adjoining switch track, of working conductors for each of said tracks, one of said tracks having sectional conductors adapted to lie out of the plane of the conductors of the other track, and means controlled by the throw of the switch for bringing said conductors into the path of the collector and completing the circuit.

4. In an electric railway the combination with a main track and an adjoining switch track, of working conductors for each of said tracks, one of said tracks having sectional conductors adapted to lie out of the plane of the conductors of the other track, and means controlled by the throw of the switch for

bringing said conductors vertically into the path of the collector and completing the circuit.

5. In an electric railway the combination with a main track and an adjoining switch track, of working conductors for each of said tracks, one of said tracks having sectional conductors normally in a different plane from that of the main conductors, and means for bringing said sectional conductors into the plane of the main conductors to complete the circuit therethrough.

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

GEORGE H. BENJAMIN.

Witnesses:
GEO. H. CHANDLEE,
KONRAD WOLFF.