(No Model.) 2 Sheets—Sheet 1.

B. F. SUTTON.

CLOSED CONDUIT FOR ELECTRIC RAILWAYS.

No. 484,924. Patented Oct. 25, 1892.

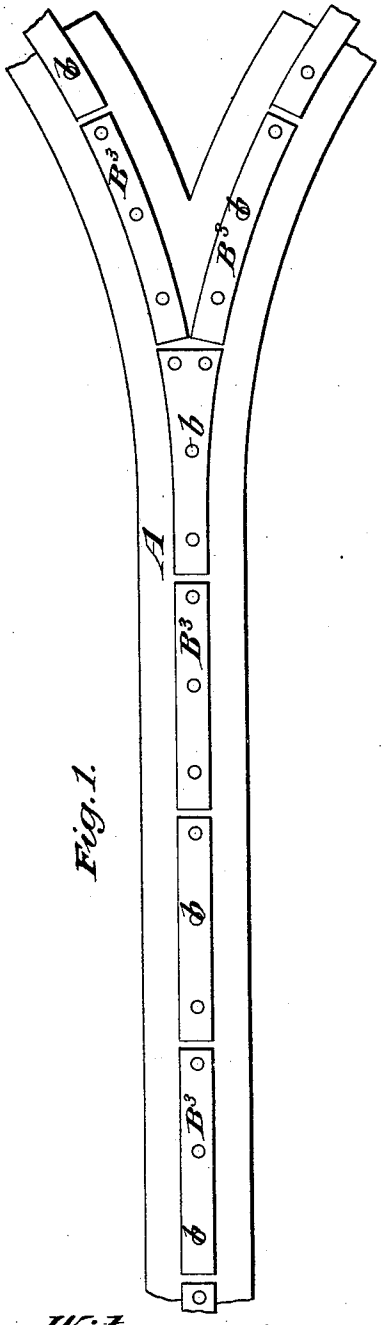

Fig. 1.

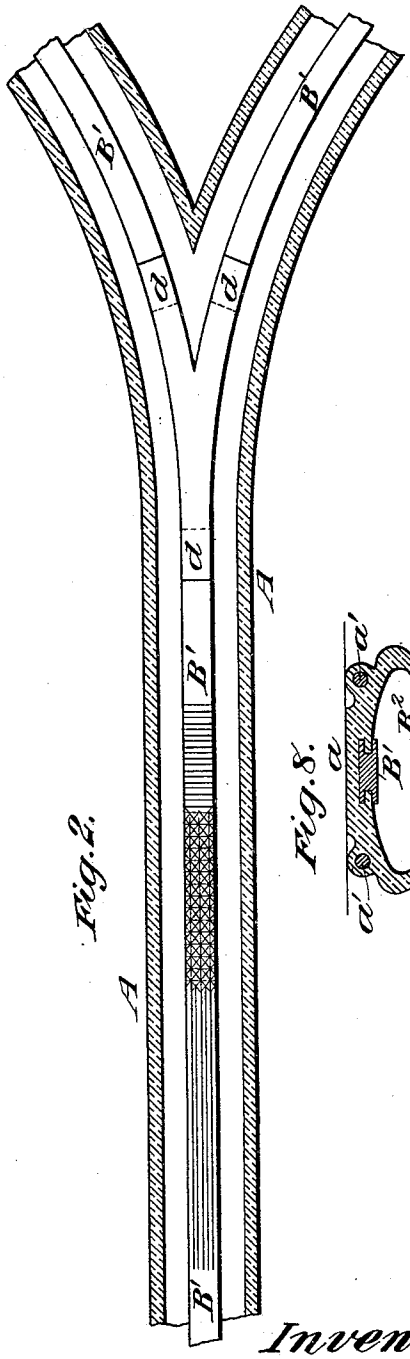

Fig. 2.

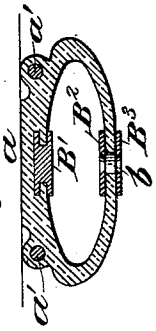

Fig. 3.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

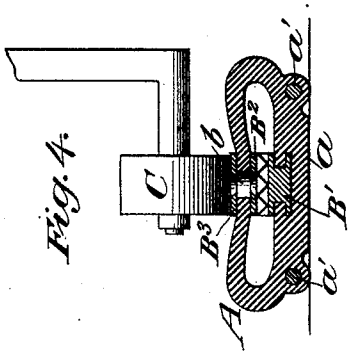


Fig. 3.

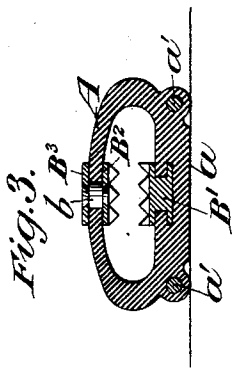


Fig. 5.

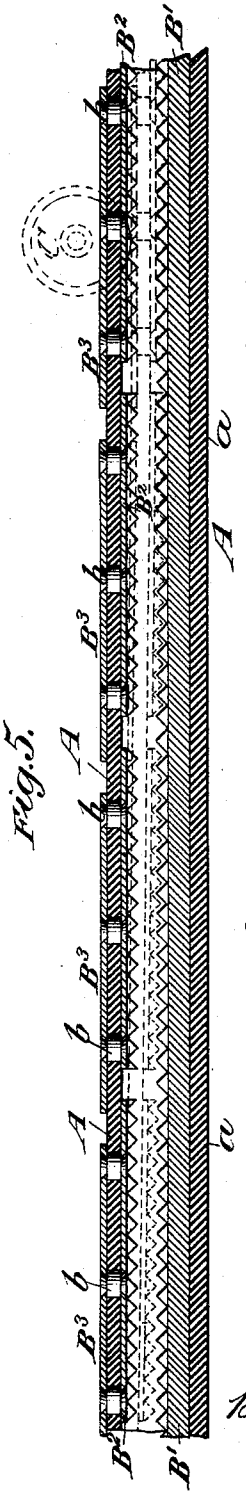


Fig. 7.

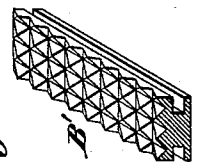
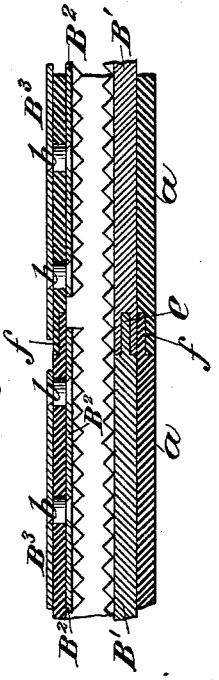


Fig. 9.

Fig. 6.



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UNITED STATES PATENT OFFICE.

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CLOSED CONDUIT FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 484,924, dated October 25, 1892.

Application filed July 7, 1891. Serial No. 398,664. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. SUTTON, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Electric Conductors, of which the following is a specification.

My invention relates particularly to electric conductors for railways or other contrivances wherein a part travels along a conductor.

My improvement consists in an electric conductor having a tube of insulating material free to collapse and expand, a main electrical conducting-surface extending along the interior of said tube or covering, a number of separate conducting-surfaces extending along the interior of said tube or covering opposite the said main conducting-surface, and a conducting-surface on the exterior of the said tube, communicating electrically with the separate conducting-surfaces previously mentioned.

My improvement further consists in certain details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan view of an electric conductor embodying my improvement. Fig. 2 represents a section of the same. Fig. 3 represents a transverse section thereof. Fig. 4 is a transverse section showing the conductor in a different condition from that shown in Fig. 3, and includes a view of the traveling contact-piece deriving current therefrom. Fig. 5 represents a central longitudinal section of the conductor, and includes a representation in dotted outline of the traveling contact-piece and a representation of the condition of the conductor when acted upon by said traveling contact-piece. Fig. 6 is a central longitudinal section of portions of two sections of the conductor, showing the manner in which the joint between the sections is formed. Fig. 7 is a perspective view of a portion of the main electrical conducting-surface of the conductor; Figs. 8 and 9, transverse sectional views illustrating a modification of the conductor.

In the example of my improvement illustrated by Figs. 1, 2, 3, 4, 5, 6, and 7, A designates a tube or covering of insulating material, such as soft india-rubber, and made continuous. This tube or covering is shown as of elliptical form, although this form is not essential. It may be fastened in place in any position—as, for instance, with its base-surface *a* resting on the top of any suitable support, as shown in Figs. 3 and 4. The said tube may be fastened to its support in any suitable manner, and it may, if desired, be stiffened by rods or wires *a'*, running lengthwise through its wall and wholly embedded therein. These rods or wires may serve as a means for fastening the conductor to its support.

B′ designates the main conducting-surface of the conductor. As shown in Figs. 2, 3, 4, 5, 6, and 7, it consists of a rod or strip of metal fitted in a groove formed along the interior of the tube or covering A and having side flanges for embracing the adjacent portions of the material, so as to be fastened thereto. That portion of this conducting-surface which projects within the tube or covering is represented as corrugated or grooved both longitudinally and transversely, so as to present a series of beveled projections and recesses. This main conducting-surface is intended to be continuous and will be made of sections, such sections being spliced together by simply overlapping each other, as shown at *d* in Fig. 2, or by mortises and tenons provided at their ends, as shown at *e* in Fig. 6. Obviously the tube or covering may also be made in sections united by making one end of one section of reduced size to enter a counterbore in the adjacent end of the next section, as shown at *f* in Fig. 6.

B^2 designates separate conducting-surfaces arranged on the interior of the tube or covering A opposite the main conducting-surface B′. These separate conducting-surfaces B^2 are represented as consisting of metal plates fastened to the tube or covering opposite the main conducting-surface B′, so as to be in line with each other. Outside of the tube or covering A is another conducting-surface B^3, represented as consisting of a number of metal plates arranged in line opposite the interior of the separate conducting-surfaces B^2. These metal plates B^3 are also represented as separate from each other. The said plates B^2 and B^3 are represented as fastened to the tube or covering and connected together

electrically by metal rivets *b*, extending through the tube or covering and engaging with the said plates. The inner faces of the said plates B^2 are represented as corrugated longitudinally and transversely to correspond with the longitudinal and transverse corrugations of the inner face of the conducting-surface B′. The ends of the series of plates B^2 and B^3 may be and are represented in Figs. 5 and 6 as arranged so that the ends of the plates of the two series B^2 and B^3 lap beyond the interruptions between the ends of the plates of the other series.

In adapting this invention to the switches or branches of an electric railway the conductor will have branches corresponding exactly with the switches or branches of the railway, as may be understood by reference to the right-hand ends of Figs. 1 and 2, wherein the conductor is shown adapted to two branches.

Normally the condition of the tube or covering will be such that the separate conducting-surfaces B^2 will be out of contact with the main conducting-surface B′, as shown in Figs. 3 and 6, and in full outline in Fig. 5. A traveling contact-piece C, carried by a car or other device, travels along that portion of the tube or covering having the conducting-surfaces B^2 and B^3 arranged upon it. This contact-piece will press against the tube or covering with such force as to compress it and force the conducting-surfaces B^2 into contact with the main conducting-surface B′, as shown in Fig. 4 and in dotted outline in Fig. 5. Owing to this, current constantly passes from the main conducting-surface B′ through one of the conducting-surfaces B^2, and thence through the conducting-surfaces B^3 to the traveling contact-piece C, whence it may pass to the car or other device by which the traveling contact-piece is carried. Immediately upon the passage of the traveling contact-piece beyond any part of the conductor the tube or covering will resume its normal condition, thereby separating the separate conducting-surfaces B^2 from the main conducting-surface B′, rearward of the traveling contact-piece C.

The example of my invention just described with reference to Figs. 1 to 7, inclusive, will be understood to be adapted to a railway in which the conductor is placed below the cars. The example shown in Fig. 8 consists of an inversion of that shown in the preceding figures, adapted to cases in which an overhead conductor is used and the contact-piece presses upward. In this last example I have shown the inner faces of the main conducting-surface B′ and of the separate conducting-surfaces B^2 flat.

I prefer to make the contact-faces of B′ and B^2 with concave and convex surfaces in order to insure a better contact without any liability to sparking. The simplest form for such concave and convex surfaces is a longitudinal channel *g* in one and a longitudinal tongue *h* on the other, as shown in Fig. 9, which represents a transverse section of the conducting-surfaces; but I at present consider the best form for such concave and convex faces the corrugated one described with reference to Figs. 1, 3, 4, 5, 6, and 7, in which the apexes of the corrugations in B^2, striking against those of B′, will insure proper contact. The corrugations may be both longitudinal and transverse or only longitudinal or transverse.

The lapping of the ends of the plates B^2 and B^3, while not impairing the longitudinal flexibility of the part of the tube to which they are attached, will obviate the liability to sparking.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with an inclosing tube of flexible insulating material, of a main conductor extending along the inner wall of the tube and a series of conducting-plates extending along the interior of the tube opposite the main conductor, the adjacent faces of the main conductor and the series of conductors being provided with transverse corrugations adapted to interlock when the parts are brought into contact, substantially as set forth.

2. The combination, with an inclosing tube of flexible insulating material, of a main conductor extending along the inner wall of the tube, a series of conducting-plates extending along the interior of the tube opposite the main conductor, and a second series of conducting-plates extending along the exterior of the tube and electrically connected with the series extending along the interior, the plates of said series being arranged to alternately overlap the portion of the tube intervening between two successive ends of the plates, substantially as set forth.

3. The combination, with an inclosing tube of flexible insulating material, comprising in itself a holder and retainer for the conductors, of a main electric conductor within the tube and dovetailed into the wall of the tube and an interrupted electric conductor attached to the tube opposite the main conductor and exposed to contact within and without the tube, substantially as set forth.

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