Nov. 27, 1928.

A. WICHERT

1,693,359

CONNECTION FOR ELECTRICAL CONDUCTORS

Filed Jan. 27, 1927

Fig. 1

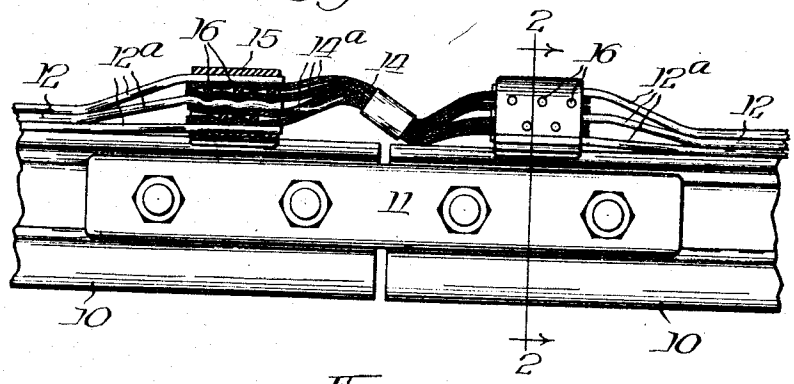


Fig. 2

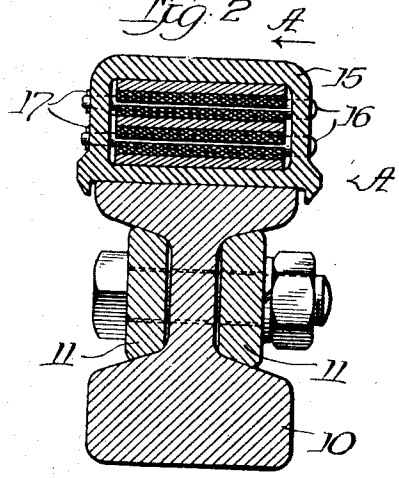
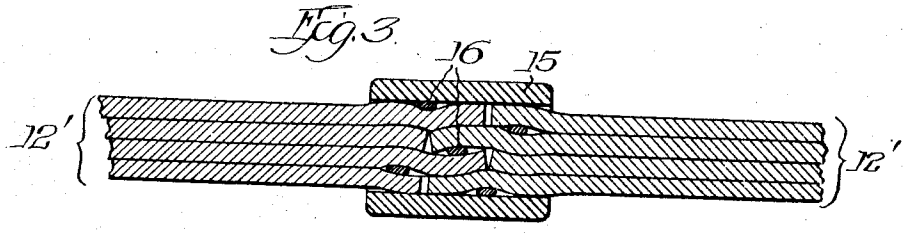


Fig. 3



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UNITED STATES PATENT OFFICE.

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CONNECTION FOR ELECTRICAL CONDUCTORS.

Application filed January 27, 1927, Serial No. 164,057, and in Germany February 3, 1926.

This invention relates to couplings for electrical conductors, such as composite conductors made up of a plurality of laminations or similar component elements.

The general object of the invention is the provision of a coupling which will provide a good mechanical and electrical connection for such conductors, which may be easily installed, and which will facilitate the disconnection of the connected members when desired.

A specific object of the invention is the provision of such a coupling which may be utilized and installed with facility in positions where space is limited.

Another specific object is the provision of such a coupling which eliminates necessity for any special shaping or piercing of the conductors as a prerequisite to its application, and which provides liberal allowance for variation in the relative positioning of the connected members in the making of the connection.

Yet another particular object of the invention is the provision of a coupling or connection of the sort described which affords a desirable adjustability of the connected conductors for accommodation of thermal contraction and expansion or other shifting, while maintaining the coupling and the connected conductors in the desired operative relationship and in proper relationship to associated elements.

Yet another object is the provision of a coupling of the sort specified which will be effective to form a good mechanical and electrical connection irrespective of variations in the dimensions of the connected elements of the conductors.

Other and further objects and advantages will be pointed out or indicated hereinafter or will appear to one skilled in the art upon an understanding of the invention or its employment in practice.

In the drawing forming a part of this specification, I show, for purpose of exemplification, two structural embodiments of the invention, but it is to be understood that the scope of the invention as defined in the appended claim is not limited to these particular embodiments or the details thereof.

In the drawing,

Fig. 1 is a side elevational view, with a part in section, of a joint connection of an under-surface contact rail of a type employed in electrical railway systems;

Fig. 2 is a cross section, on a larger scale, such as taken on approximately line 2—2 of Fig. 1; and

Fig. 3 is a detail in the nature of a longitudinal section through a coupling of slightly modified form.

The nature of the invention may be most quickly ascertained by reference immediately to the illustrative embodiments shown. In that illustrated in Figs. 1 and 2, the reference numerals 10 designate the end portions of contact rails of the under-surface type, such as employed for distributing current to electric railways. These rails are mechanically connected by the plates 11, proper spacing between the rails being allowed for the accommodation of thermal expansion. In order to provide the requisite electrical connection between the rails thus joined, it is necessary to provide some sort of bonding, by way of a good electrical conductor, across the joint, which bonding connection must also be able to accommodate limited relative adjustments of the connected rails, such as the expansion and contraction resulting from temperature changes and other movements occuring in the use of the installation. For this purpose, conductors 12 are connected to the respective rails, said conductors being made up each of a plurality of laminations or elements 12^a. A suitable flexible conductor 14 is provided for electrically connecting the conductors 12, said connecting conductor being made up of flexible elements or laminations 14^a. The length of the connecting conductor 14 is such that its ends will overlap the ends of the elements 12^a. A constraining member 15, in the nature of a sleeve, is suitably formed to receive, within its longitudinal passage, the ends of the conductors 14 and 12 which are arranged therein in overlapping relationship with some of the laminations of one of said conductors interposed between laminations of the other. Opposite walls of the constraining member 15 are provided with aligning apertures in distributed arrangement, through which wedges or tapering pins 16 are driven, said pins passing between the laminations of the conductors. The arrangement of said apertures is such

that these wedges are in staggered relationship in the direction intersecting the overlapped laminations. The total height of the passage in the constraining member 15 is slightly in excess of the aggregate height of the overlapped laminations so that the wedges may be received, but with a very tight binding fit. Introduction of the wedges thus compresses the laminations very tightly upon one another under the constraint of the member 15, and, due to the staggered relationship of the wedges, convolutes the laminations into a somewhat intermeshing relationship. This gives the laminations of the connected conductors a very close and extensive surface contact, conducive to good electrical conduction, and also affords a very secure mechanical connection of the conductors, as their convolutions hold them against longitudinal withdrawal from one another, and the wedges, which have anchorage in the apertures of the constraining member, retain the intermeshed conductors from withdrawal from the latter. The wedges are held against withdrawal by cotter pins 17. The coupling may be disconnected quite quickly and readily, when desired, by withdrawing the cotter pins and driving out the wedges. This frees the conductor laminations so that they may be withdrawn from the constraining member 15. The constraining member 15 is suitably shaped to seat on the rail, whereon it is retained by the conductor 12, which is substantially inflexible transversely. The laminations of the connecting conductor 14 may be made up of small wire woven or twisted together so as to have a limited amount of compressibility.

In the arrangement illustrated in Fig. 3, the laminations of the conductors 12′ are arranged in end-butting relationship and some of them in overlapping relationship, with the butt joints between adjacent laminations offset or mutually displaced. This arrangement has the advantage of materially reducing the total height of the coupling. In this arrangement, as in the one illustrated in Figs. 1 and 2, the wedges are of electrical conductive material and form part of the electrical as well as the mechanical connection in the coupling.

The invention has various distinctive advantages, particularly in installations which are exposed to weather, as the portions providing the mechanical connection are not easily affected by dirt or water in a manner such as to render them difficult of disconnection, while the surfaces relied upon for the electrical connection are effectively protected. The invention is of particular advantage because it does not require the special shaping of the connected conductors and allows liberal latitude in their relative positioning.

What I claim is:

In electrical conductors, the combination with laminated conductors, of a flexible connecting conductor having component laminations, the end portions of the laminations of the connecting conductor being overlapped with the end portions of laminations of the other conductors, constraining members embracing the overlapped portions of said laminations, and wedges passing transversely through said constraining members between some of the overlapped laminations and clamping some of the laminations in close surface contact under constraint of the constraining members.

In testimony whereof I have hereunto subscribed my name this 10th day of January, A. D. 1927, at Zurich, Switzerland.

ALFRED WICHERT.