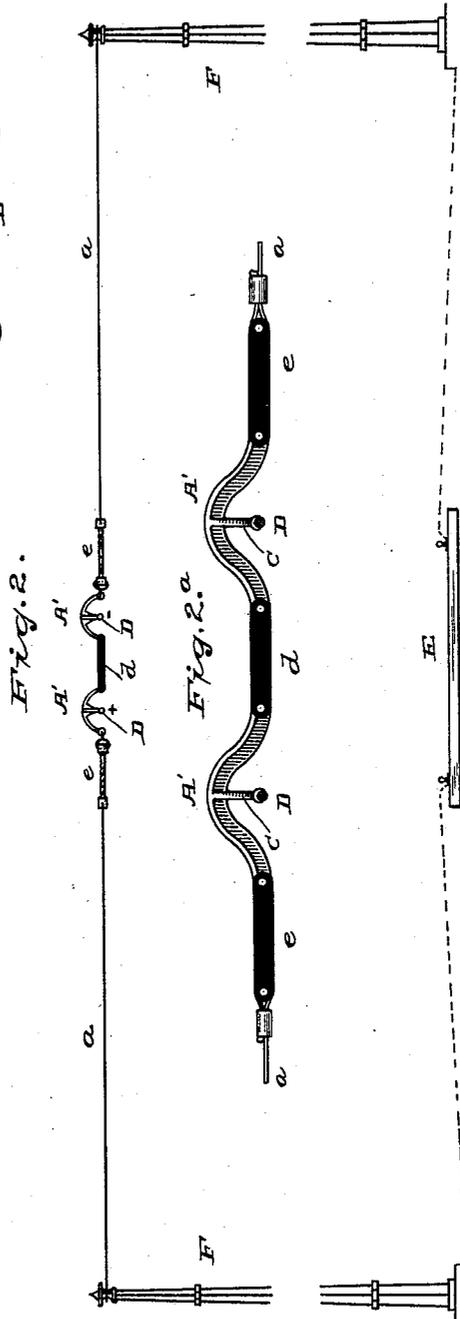
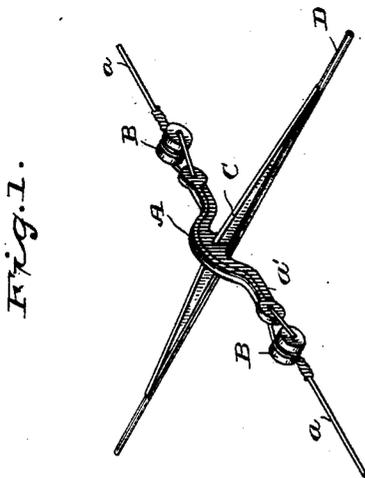
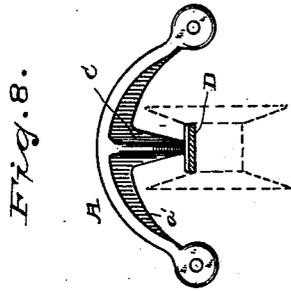
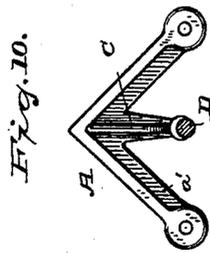
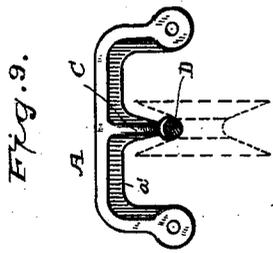


C. J. VAN DEPOELE.

ARCHED SUSPENDER FOR OVERHEAD ELECTRIC CONDUCTORS.

No. 393,317.

Patented Nov. 20, 1888.



Witnesses,

H. A. Lamb
C. S. Stutevant

Inventor,

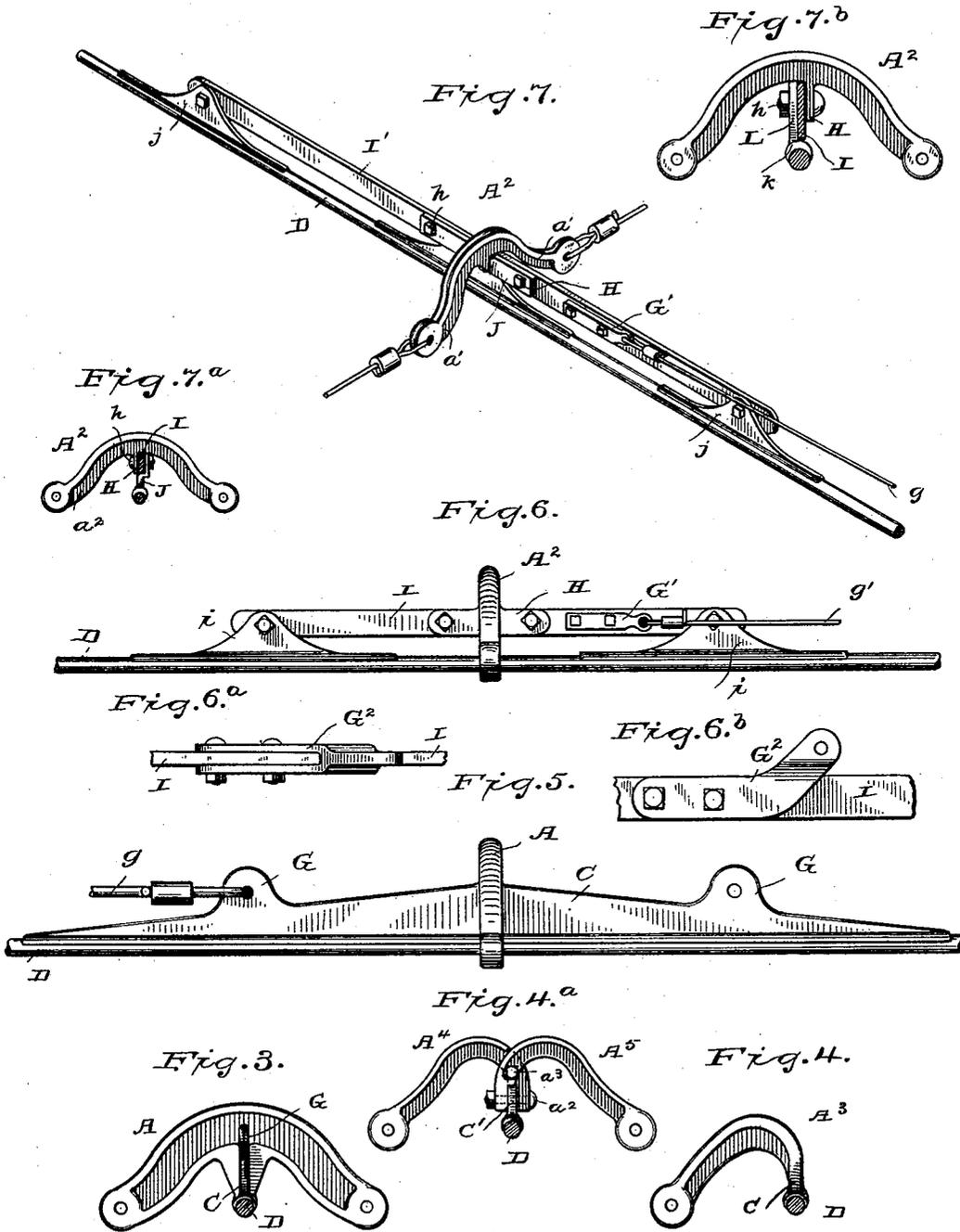
By *Charles J. Van Depoele*
Frankland James
 Attorney.

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UNITED STATES PATENT OFFICE.

CHARLES J. VAN DEPOELE, OF LYNN, MASSACHUSETTS.

ARCHED SUSPENDER FOR OVERHEAD ELECTRIC CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 393,317, dated November 20, 1888.

Application filed August 22, 1888. Serial No. 283,445. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. VAN DEPOELE, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Arched Suspenders for Overhead Electric Conductors, of which the following is a description.

My invention relates to an improved means for suspending and supporting the current-supplying conductor or conductors of an electric railway of the type in which the current is taken from an overhead conductor by a contact device traveling with the moving vehicle. Suspended supply-conductors are usually carried by devices suspended from cross-wires attached to poles placed along the line of way. Devices heretofore used for this purpose have usually depended in some manner below the cross supporting-wire, and so have been subject to the lateral strain of the conductor wherever said conductor was deflected from a straight course and on curves. By my improvement these difficulties are entirely overcome, and a suspending device provided by which the conductor can be securely held in any desired position, and which at the same time provides ample clearance for the contact-trolley.

The device embodying the principal feature of the invention I have called an "arched suspender," and a prominent feature of the improvement resides in the fact that the conductor is by means thereof supported in the same transverse plane as the cross-wire, and therefore cannot tilt its immediate support, whatever the desired position of the conductor, a difficulty frequently interfering seriously with the operation of a railway when equipped with downwardly-extending supporting devices. Other advantages incident to my improvement will be hereinafter pointed out, together with the preferred form of construction and arrangement.

In the drawings, Figure 1 is a perspective view of the simplest form of my conductor-supporting devices. Fig. 2 is a view in elevation showing the poles and track of an electric railway together with the conductor-supporting devices in position upon the cross-wire. Fig. 2^a is an enlarged detail of the conductor and suspending devices. Fig. 3 is an

end view of the arched suspender shown in Fig. 1. Fig. 4 is a detail elevation showing an end view of the form of suspender used in some positions. Fig. 4^a is a similar view showing a modified construction. Fig. 5 is a view in elevation showing the arched suspender with additions adapting it for connection with anchorage-cables. Fig. 6 is a view, also in elevation, showing the arched suspender connected to duplex anchorage-ears. Fig. 6^a and 6^b are details showing attachment of anchorage-lugs. Fig. 7 is a perspective view of anchorage-plate combined with an arched suspender. Fig. 7^a is an end view on the line 7-7, Fig. 7. Fig. 7^b is an end view showing a slightly different form of the parts shown in Fig. 7. Figs. 8, 9, and 10 are views indicating a number of different shapes which my arched suspending devices may assume.

Similar letters denote like parts throughout.

As illustrated in the drawings, my improved wire-suspending device comprises, as seen in Fig. 1, a metal arch, A, to the extremities of which the supporting cross-wires *aa* are attached. As shown, the insulators B B are interposed between the extremities of the cross-wires *aa* and the extremities of the arch A. Other means of insulation may, however, be used in this connection. (See Figs. 2 and 2^a.) The insulators B B may be dispensed with and the cross-wires attached directly to the extremities of the arch, as seen in Fig. 7. To the central portion of the arch A, and extending therefrom at right angles, is formed an ear, C, which is made tapering toward its extremities and grooved upon its under side, the conductor D to be suspended being firmly secured to the groove in the ear C, preferably by soldering or brazing, although other means of attachment may be employed.

In Fig. 2, E represents the track of an electric railway. F F are poles near the line of way. *aa* are the cross-wires, which may be heavy galvanized iron wire or wire cable, and A' A' are two arched suspenders supporting conductors D D of positive and negative polarity, respectively. Where, as in the present instance, two suspended conductors are used, the suspenders A' A' are placed in proximity to each other and their adjacent ends united by a link, *d*, of insulating material. Their outer ends are also connected to insulating de-

vices *cc*, the extremities of which are attached to the wires *aa*, by which the suspending and insulating devices and the conductors secured thereto are supported at the desired height above the track.

The suspenders *A A*² in Figs. 1 and 7 are shown as being provided with extended end portions, *a' a'*; but this is not essential, the ordinary form in which the suspended device is constructed being seen in Fig. 3. The form of the arch *A* is not restricted to that shown in Fig. 1, and for the sake of illustration other shapes are indicated in Figs. 8, 9, and 10, all of which embody the principles of my invention.

It will be noted that the conductor-supporting device depending from or attached to the central portion of the arch or curve of the suspender does not extend below the plane of the point of attachment for the cross-wires by which the suspender is supported, the object being to provide strong, durable, and substantial means for supporting an aerial conductor, whether in a straight or deflected line; and I find that by arranging the conductor and its transverse supports in the same horizontal plane that the said suspender will carry the conductor in any desired position without being itself deflected or caused to kick up at one end on account of the lateral strain of the conductor. The arched or curved form of the suspender is to allow free passage of the flanges of the trolley-wheel, and any form of device by which the main conductor can be supported substantially in the same plane as its transverse supports with space on each side of its said support for the passage of the flanges of the trolley-wheel is included in my invention.

My improved suspender is particularly useful in supporting the conductor above curved portions of the track, since by its use I am enabled to make a firm and strong connection with the conductor, which is supported in its position by the lateral and slightly upward pull of the cross-wire, which on curves need only be attached to one side of the arched suspender. In this instance I prefer, for appearances, to use a suspender, *A*³, having one side cut away, substantially as shown in Fig. 4, although I may use the complete form either with a single or with a double cross-wire.

In many instances it is desirable to connect an anchorage cable with straight portions of the main conductor for the purpose of holding guy or other cables upon curved portions of the track, as also to in some instances relieve long straight portions of conductor from the great longitudinal strain of long lengths of wire, grades, &c., as well as to keep said straight portions taut. For use in positions where a moderate longitudinal strain is applied to the conductor, I form ears *G* upon the upper edges of the ear *C*, to which an anchorage cable or cables, *g*, can be attached. In positions where a greater strain must be applied to the conductor, instead of employing the suspending device with the added ears *G*,

I provide means detached from the arch *A*, which itself is formed with a short bracket or lug, *H*, to which is attached a metal bar, *I*, the extremities of which are secured to ears *ii*, each of, for example, twelve inches in length and grooved on their under side for permanent attachment to the conductor, substantially as in the case of the ear *C*. This arrangement offers an extremely durable and efficient connection with the conductor and one capable of withstanding great longitudinal strain. The anchorage cable or cables *g'* are secured directly to the bar *I*, or to an ear, *G'*, formed on or attached thereto. As seen in Figs. 6^a and 6^b, the anchorage-cable is secured to an ear, *G*², which is in the form of a strap passing over and attached to both sides of the bar *I*.

Where, as may sometimes happen, it is desired to attach anchorage devices at points where the main conductor has been spliced or to provide extra support where joints are made, I employ the construction shown in Figs. 7, 7^a, or 7^b, in which three ears, *Jjj*, are provided. The ears *jj* are soldered upon the conductor, in the manner described, and secured at opposite ends of their support, after which the end portions to be united are abutted under and soldered fast in the groove of the central ear, *J*. The three ears *Jjj* are secured to a metallic, preferably steel, plate or bar, *I'*, which is then attached to the bracket *H* of the arched suspender *A*².

As seen in Figs. 7 and 7^a, the central ear, *J*, is formed with an offset or rabbet at its upper edge, said upper edge resting against the outer side of the plate *I'*, the ear and plate being firmly secured to the bracket *H* of the suspender by through-bolts *h*. In Fig. 7^b, however, I have shown a slightly-modified and a preferable construction. In this form the lower portion, *kk*, of the ear *L* is formed at one side thereof, so that the plate *I*, being centrally supported under the arched suspender and the ear *L* attached at one side thereof, the grooved part *k* of the ear *L* and the conductor supported therein will be directly under the central line of the arch.

As seen in Fig. 7, the anchorage-cable *g* is attached at one side only of the plate *I*, and in some positions, as where the conductor is deflected from a straight line, the sidewise pull exerted by a cable attached in this manner will be of advantage; but where the anchorage-cable is in line with the conductor and no deflection is desired, the connection will be in line with the said plate and with the conductor, as indicated by the form of attachment shown in Figs. 6^a and 6^b.

On straight portions of the line it is usual to suspend the conductor by securing thereto an ear—such, for example, as *i*—and suspending the conductor by connecting said ear vertically with the cross-wire, mere vertical suspension being all that is required. Where, however, it is preferred to support the conductor more firmly and permanently than by the method just described, my arched sus-

penders will be used; and it will be understood that where the arched suspender is used on straight portions of the track it is not essential that the conductor be at all times in the same horizontal plane as the cross-wires, so that for such uses the suspender may be modified in many ways without departing from the spirit of the invention. It is essential, however, that the conductor be in the same horizontal plane as its transverse supports whenever it is subjected to lateral strain.

I have described the arched suspender as a single casting spanning the conductor and provided with a depending central portion for attachment thereto; but this form is not essential, as the desired results may be retained with a modified construction. An illustration of this is found in Fig. 4^a, in which is shown an arched suspender, to all intents and purposes the same as the solid casting shown in the other figures of the drawings, but formed of two separate parts, A⁴ A⁵, each similar to the form shown in Fig. 4, the extremities of which engage opposite sides of the ear C', to which the conductor is attached. The arches A⁴ A⁵ may be separately attached to the ear C', or be attached opposite to each other and connected and secured to the ear C', to which they are united, as shown, by a through-bolt, a². The arches A⁴ A⁵ may also be further united by a bolt or rivet, a, to prevent a shearing movement between them, which would be likely to break the bolt a².

The term "metallic arch," as applied to the part spanning the main conductor and to which the cross-wires are secured, is used in its broadest sense, since any construction that affords a support for the conductor and is adapted to receive the cross-wires for supporting the same and is also so formed as to allow a grooved contact-wheel to pass thereunder must necessarily constitute an arch. The term "ear" is applied to the part to which the suspended conductor is directly secured, and is intended to apply to any form of extension integral with or attached to the metallic arch and to which the conductor can be secured in any manner capable of allowing the unobstructed passage of the contact-wheel.

The modifications shown in Figs. 4 and 4^a are not herein specifically claimed, since they form the subject-matter of a separate application filed by me November 7, 1888, Serial No. 290,176.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A suspending device for electric conductors, comprising a metallic arch spanning the conductor and adapted to be secured to transverse supports, and an ear depending from the arch and connected to the conductor to be suspended, substantially as described.

2. A suspending device for electric conductors, comprising a metallic arch spanning the conductor and secured to transverse wires or cables and having an ear depending from the arch and connected to the conductor in the

same horizontal plane as the transverse supports, substantially as described.

3. The combination, with a suitable conductor, of means for suspending the same, comprising an arch spanning the conductor and adapted to be secured to a cross-wire at its extremities and having a conductor-supporting device depending from the under side of the arch, substantially as described.

4. A supporting device for suspended conductors, comprising a metallic arch having a wire-securing part depending from its under side and adapted to sustain a wire in substantially the same horizontal plane as the supports to which the arch is connected, substantially as described.

5. The combination, with a suspended conductor, of an ear adapted to be permanently secured upon the upper side of said conductor, and a metallic arch spanning the conductor and secured to said ear and to the cross-wires, substantially as described.

6. Means for suspending an electric conductor in positions other than a straight line, comprising a cross-wire and an arched suspender spanning the conductor and secured at its ends to and forming part of the transverse support and having a wire-sustaining part depending from its under side into substantially the plane of the transverse support, substantially as described.

7. An ear adapted to be attached to and to support a suspended conductor and formed with anchorage-lugs for attachment to traction-cables exerting a longitudinal strain upon the conductor, and a suspending device spanning said ear and connected to the transverse support, substantially as described.

8. An ear adapted to be attached to and to support the conductor and provided with anchorage-lugs for attachment to a traction cable or cables, and a metallic arch crossing said ear and having its extremities in substantially the same transverse plane as the conductor when secured to the ear, substantially as described.

9. The combination of ears permanently secured upon the conductor, a metallic plate or bar connecting the ears, and a metallic arch spanning the bar and formed with a bracket at its under side for attachment thereto, substantially as described.

10. Means for making a smooth joint in a suspended conductor, comprising two or more ears adapted to be secured upon the conductor, a plate or bar to which the ears are connected, and an additional ear grooved to receive the extremities of the conductor and to be permanently secured thereto and also attached to the plate or bar, substantially as described.

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

CHARLES J. VAN DEPOELE.

Witnesses:

FRANKLAND JANNUS,
C. W. DUSTIN.