No. 771,875. PATENTED OCT. 11, 1904.

C. DE KANDÓ.

OVERHEAD TROLLEY WIRE SYSTEM.

APPLICATION FILED OCT. 14, 1903.

NO MODEL.

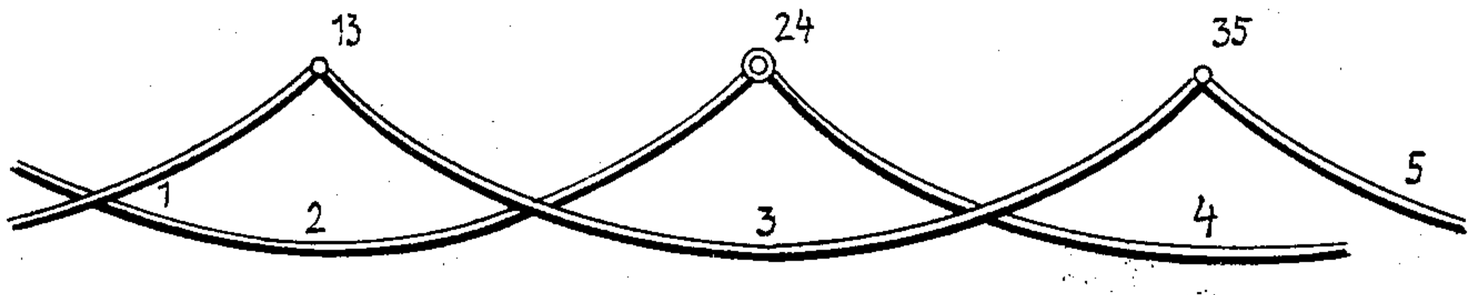

Fig. 1.

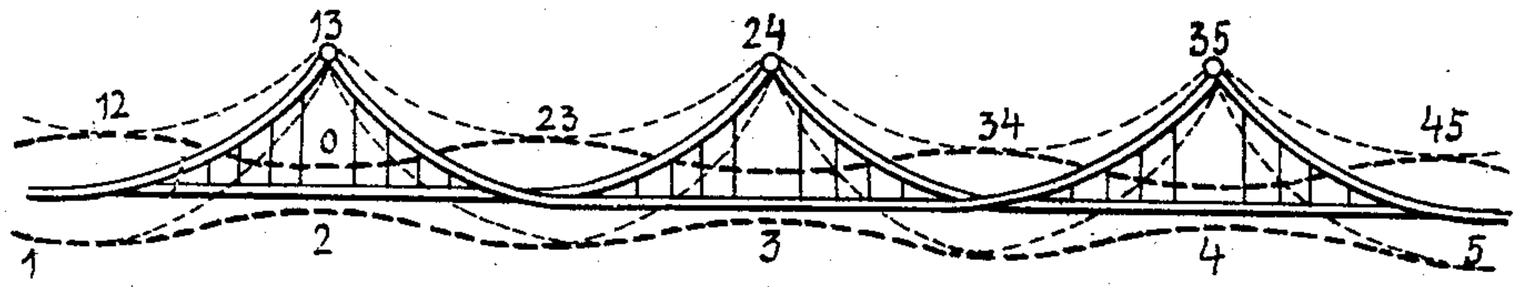

Fig. 2.

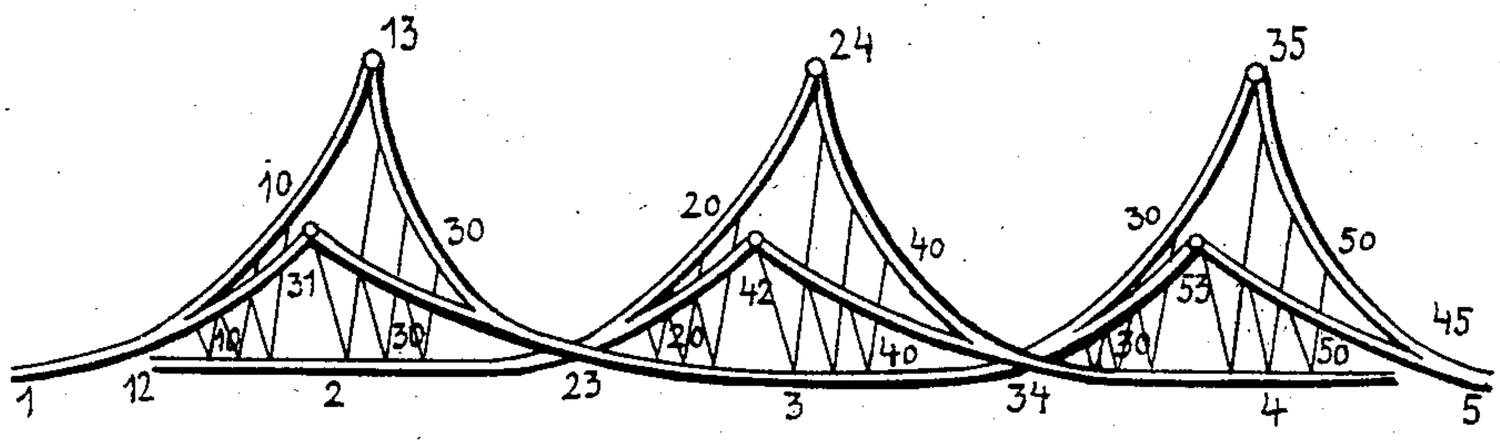

Fig. 3.

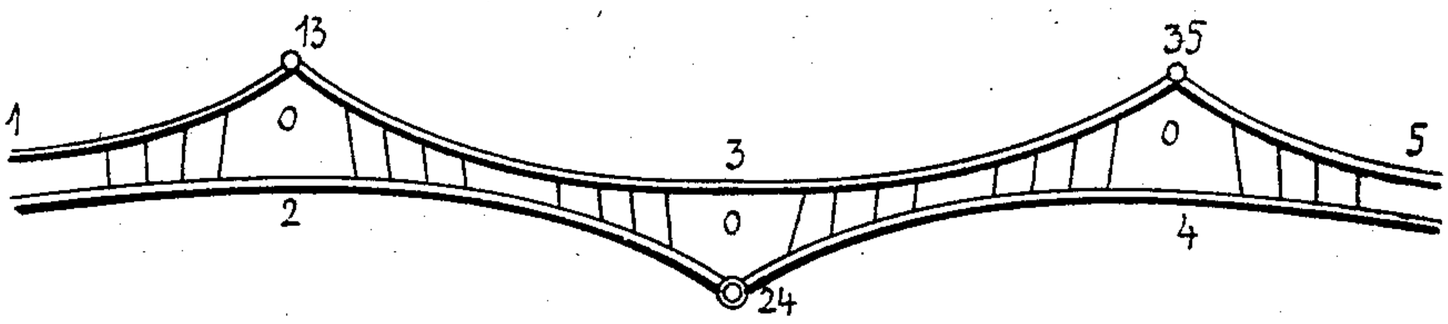

Fig. 4.

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No. 771,875. Patented October 11, 1904.

UNITED STATES PATENT OFFICE.

COLOMAN DE KANDÓ, OF BUDAPEST, AUSTRIA-HUNGARY.

OVERHEAD TROLLEY-WIRE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 771,875, dated October 11, 1904.

Application filed October 14, 1903. Serial No. 177,086. (No model.)

To all whom it may concern:

Be it known that I, COLOMAN DE KANDÓ, engineer, a subject of the Emperor of Austria-Hungary, residing at Budapest, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in or Relating to Overhead Trolley-Wire Systems, of which the following is a description.

In overhead electric systems in which the trolley glides on the under side of the conductor it often occurs that the trolley slips off the conductor upon arriving at the joints or branches of the latter, thereby in the first place producing an arc and in the second place violently springing back to the conductor. During the early working of the line or with new conductors this drawback is not generally experienced, owing to the overhead wire being so stretched during its erection that even in warm weather—*i. e.*, during the time of its greatest expansion—it is raised by the trolley to such an extent that an inflection of the curve of the wire is produced at the point of attachment, enabling the trolley to smoothly pass over the latter. However, this occurs for only a short time, as the constant variation in the suspension curvature of the wire soon causes a constant deformation of the wire at the joints, whereby at this point of the wire so sharp an angle is produced that at normal pressure the trolley is unable to convert it into a smoothly-shaped curve. A large increase in the number of points of attachment renders, it is true, the angle formed thereby more obtuse. However, this method contributes to breakages of the wire, as the latter, owing to the lack of a compensating sag, is too strongly stretched during cold weather and runs a great risk of being broken. When the points of attachment are at greater distances from one another, the contraction under low temperature does not result in any danger of breakage; but the sharp attacks at the points of attachment prevent a smooth gliding motion of the trolley. In overhead wires with lateral contacts on the trolley the influence of the variation of the sag is suppressed; but the lateral oscillations of the wire, which easily occur, often cause the trolley to leave the wire.

The object of the present invention is to construct a working conductor with underside contact of the trolley in which and in spite of frequent and great changes in temperature a smooth path is offered to the trolley, while at the same time lateral oscillations are prevented.

This invention consists in the working conductor being constituted by two instead of one wire, which wires are alternately suspended from the successive posts or supports, so that between each two suspension-points a crossing-point is formed by the conductors, while the parts of the wire suspended between the two crossing-points are connected with the aid of wires or rods to the corresponding upper parts of the wire in such a manner that the lower parts of the wire form an almost parallel guide with respect to the track.

In the accompanying drawings several constructions are shown, in which—

Figure 1 represents the main skeleton before the fitting of the wires or rods—*i. e.*, before any provision is made for the prevention of lateral oscillations. Fig. 2 is a lateral view of the complete arrangement. Fig. 3 is a perspective view of a conductor device secured against lateral oscillation, and Fig. 4 is a plan view showing a simpler arrangement to that shown in Fig. 3.

Throughout the figures one wire is shown by a single thick line and the other wire by double lines, while the connecting-wires are represented by single thin lines.

In Fig. 1, 1, 3, and 5 represent loops in one conductor attached or supported in any convenient manner at the points 13 35, while the second conductor 2 4 shows its point of suspension at 24. In Fig. 2 suspension-wires O are shown connecting the middle part of one loop to the upwardly-curving end of the two adjacent loops, the points at which these auxiliary wires are attached being so chosen that the line 12 23 34 45, &c., forms a straight line at medium temperature. When the temperature changes, this line as a whole is raised or

lowered, while the shape maintains approximately a linear form or at the utmost takes a wavy form, as shown in dotted lines, the separate sections of which smoothly run one into the other.

The conductor above described is not protected against lateral oscillation. To this end the arrangement shown in Fig. 3 is employed. In this case the wire-sections 1 2 3 4 5, &c., are divided beyond the crossing-point into two parts, which branch off from left to right and are marked 10 10, 30 30, 20 20, 40 40, 30 30, and 50 50. Thus besides the points of suspension 1 3 3 4 3 5 (shown in Fig. 1) other points—such as 31, 42, and 53—are necessary. The number of the connecting-wires O is also doubled, said wires in pairs forming an angle with one another and render the construction resistant against lateral strain. A simpler arrangement is shown in Fig. 4, wherein the alternately-looped wires 1 2 3 4 5 consist only of single wires, as in the arrangement shown in Figs. 1 and 2. However, as the uneven-numbered points of attachment in the horizontal plane are displaced with regard to the even-lettered points of attachment the planes through the wires will no longer be vertical, but the plane 1 13 3 35 5 will downwardly converge with regard to the plane 2 24 4. This arrangement has the advantage that the crossing parts which have to be employed in the first at 12 23 34 45 are in the present case suppressed, as the wires do not cross one another, but at the utmost are in tangential contact.

Naturally the suspension-wires O need not be insulated from the conductors, as the whole wire system has equal polarity.

The cross-section of the working wires, as well as that of the auxiliary wires O, can be of circular or any other suitable form.

This arrangement can be used for one, two, or more poles of the line.

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

1. In an overhead trolley-wire system, two wires of the same polarity constituting together one supply-conductor, said wires being attached alternately to successive points of suspension and forming alternating loops, means to connect the sagging central parts of the loops to the upwardly-curving parts of the adjacent looped wires, substantially as and for the purpose specified.

2. In an overhead trolley-wire system two wires of the same polarity constituting together one supply-conductor, said wires being attached alternately to successive points of suspension and forming alternating loops, wires connecting the sagging central parts of the loops, to the upwardly-curving parts of the adjacent looped wires, substantially as and for the purpose specified.

3. In an overhead trolley-wire system two wires of the same polarity constituting together one supply-conductor said wires being attached alternately to successive points of suspension situated to the left and to the right of the axis of the track, and said wires forming alternating loops, the planes of the loops of both wires converging downwardly one with regard to the other, means to connect the sagging central parts of the loops to the upwardly-curving parts of the adjacent looped wires, substantially as and for the purpose specified.

4. In an overhead trolley-wire system two wires of the same polarity constituting together one supply-conductor, said wires being attached alternately to successive points of suspension situated to the left and to the right of the axis of the track, and said wires forming alternating loops, the planes of the loops of both wires converging downwardly one with regard to the other, wires connecting the sagging central parts of the loops to the upwardly-curving parts of the adjacent looped wires, substantially as and for the purpose specified.

5. In an overhead trolley-wire system, two wires of the same polarity constituting together one supply-conductor, said wires being attached alternately to successive points of suspension, and forming alternating loops crossing one another between each two successive points of suspension, means to connect the sagging central parts of the loops to the upwardly-curving parts of the adjacent looped wires, substantially as and for the purpose specified.

6. In an overhead trolley-wire system, two wires of the same polarity constituting together one supply-conductor, said wires being attached alternately to successive points of suspension, and forming alternating loops crossing one another between each two successive points of suspension, wires connecting the sagging central parts of the loops to the upwardly-curving parts of the adjacent looped wires, substantially as and for the purpose specified.

7. In an overhead trolley-wire system, two wires of the same polarity constituting together one supply-conductor, said wires being attached alternately to successive pairs of points of suspension, and forming alternating loops crossing one another between each two successive pairs of points of suspension, said loops forming above the crossing-point two upward branches attached to corresponding points of suspension, means to connect the sagging central parts of the loops to the upwardly-curving parts of the adjacent looped wires, substantially as and for the purpose specified.

8. In an overhead trolley-wire system, two wires of the same polarity constituting to-

gether one supply-conductor, said wires being attached alternately to successive pairs of points of suspension, and forming alternating loops crossing one another between each two successive pairs of points of suspension, said loops forming above the crossing-point two upward branches attached to corresponding points of suspension, wires connecting the sagging central parts of the loops to the upwardly-curving parts of the adjacent looped wires, substantially as and for the purpose specified.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

COLOMAN DE KANDÓ.

Witnesses:

EUGENE HASSANYE,

T. LA GUARDIA.