

W. A. McCALLUM.
 CATENARY OVERHEAD SYSTEM FOR ELECTRIC RAILWAYS.
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Patented Nov. 8, 1910.

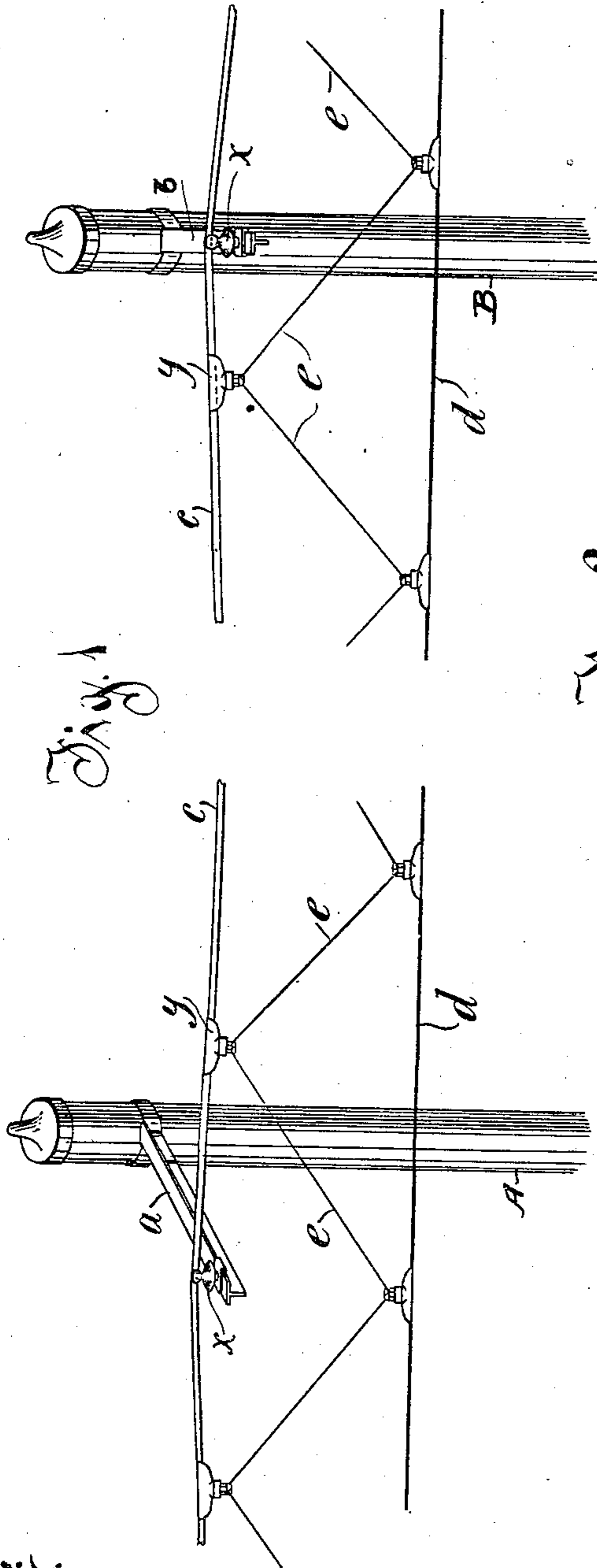
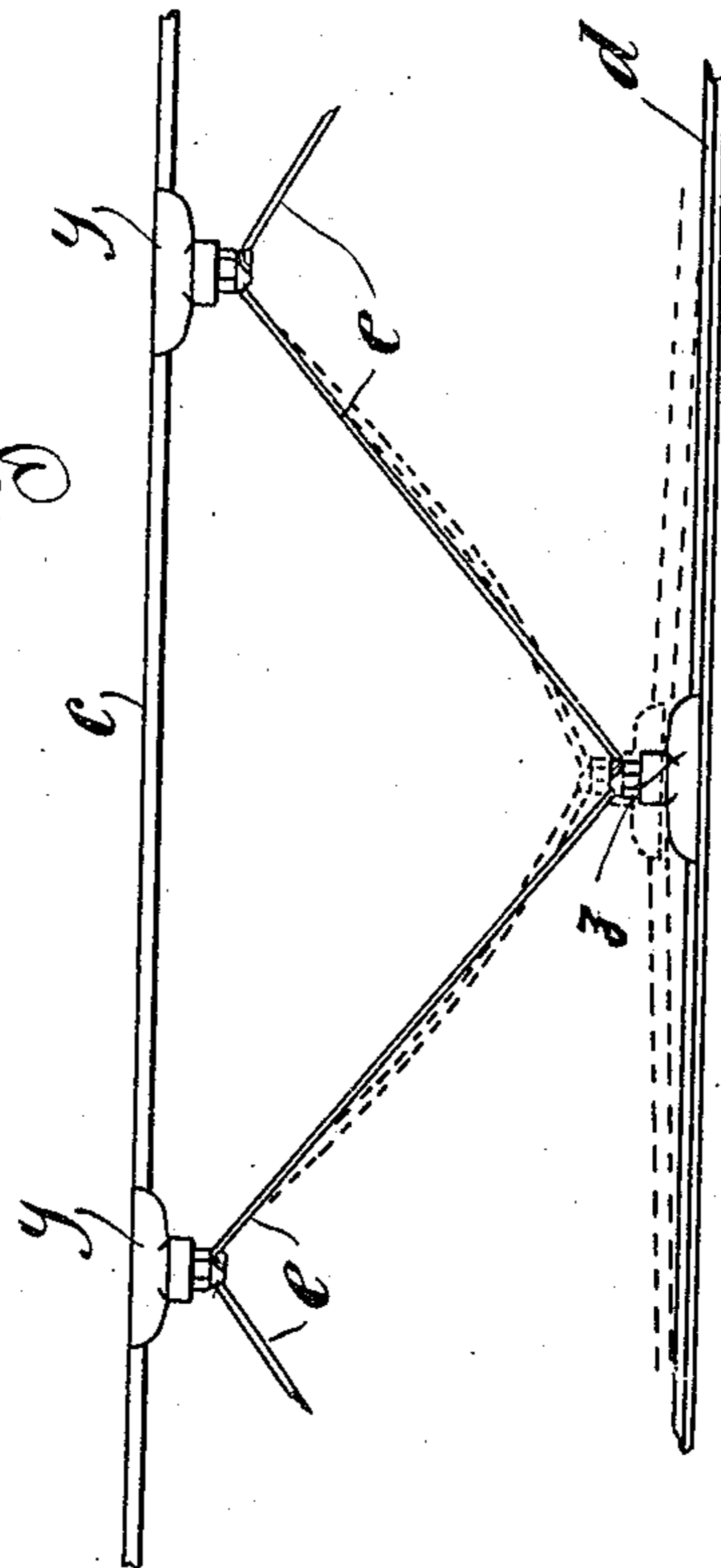


Fig. 2



Witnesses

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UNITED STATES PATENT OFFICE.

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CATENARY OVERHEAD SYSTEM FOR ELECTRIC RAILWAYS.

974,982.

Specification of Letters Patent.

Patented Nov. 8, 1910.

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To all whom it may concern:

Be it known that I, WILLIAM A. McCALLUM, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented new and useful Improvements in Catenary Overhead Systems for Electric Railways, of which the following is a specification.

In the evolution of the electric railway and its extension as a connecting link between comparatively distant points in competition with steam railways, certain difficulties—arising out of the increased speed of transit, etc.—have been encountered and particularly those connected with the overhead transmission of the electric current by a “trolley” wire and a traveling “collector” operating in contact therewith. This system requires, for theoretically perfect operation, a trolley wire maintained throughout in parallel relations with the track; but gravity, acting upon a wire held upon successive rigid supports, causes it to swing in catenary curves between the suspension points, thus introducing a varying physical resistance between the suspended wire and the traveling collector—the latter being upheld to contact by spring-tension. This variation of physical resistance recurring at short intervals, together with rigidity against the uplift of the collector at suspension points, are practically incompatible with high speed inasmuch as they cause jumping of the collector from its contact, and consequently sparking. In long-distance service, therefore, where higher speeds are requisite, resort has been had to what is known as the “catenary system” of overhead construction in which a “messenger” cable is maintained in catenary curves upon and between the fixed supports and the trolley wire is suspended to and beneath the said cable in approximately parallel relations with the track by vertical “drops” or “hangers” at short intervals. The upward tension of the traveling collector exerts a lifting power upon the trolley wire, and, to insure perfect co-action requires a certain yielding and elastic resistance in the latter—such that an artificial “wave” action thus created may proceed under uniform conditions and the collector encounter no rigid suspension points, or so-called “hard spots.” Integral perpendicular suspending hangers, however, cannot accommodate this wave movement except by “buckling” under the direct lift of the col-

lector—a difficulty inherent in this construction, which is greater where the hanger is short, as at the lower points of the catenary curves, because the short hangers have less capacity for buckling, and the inertia due to the weight of the hanger is therefore directly opposed to the lift of the collector. Several attempts have been made—as by using springs, telescopic hangers, “link-corrections” etc.,—to overcome this objection; but no satisfactory solution has yet been attained.

My invention seeks to obviate these evils and furnish an improved catenary construction by which the trolley wire is suspended from a slack messenger cable, in such a manner as to preserve a practically uniform elasticity in the trolley wire and avoid hammering action and sparking of the traveling collector in its travel.

To this end it consists in a system of catenary suspension wherein the suspending element is a wire or cable, preferably continuous, arranged in a perpendicular plane, in zig-zag continuity between the messenger cable and trolley wire, being attached by suitable clips at its upper bights to the messenger cable and by means of suitable “ears” at its lower bights, suspending the trolley wire beneath.

My invention is illustrated in the accompanying drawings, in which:

Figure 1, is a side elevation of a section of my improved construction between two contiguous fixed supports; and Fig. 2, a somewhat enlarged view of two of the upper and one of the lower suspension bights of the “lacing” cable, and the ear suspending the trolley wire therefrom, with normal and lifted positions indicated.

Referring now to the drawings, A and B, designate two successive posts of an electric railway set in the earth and provided with lateral arms, *a* and *b*, supporting, upon insulators *x*, a “messenger” cable *c*, carried between and upon these and other similar supports along the line of the railway, in catenary curves such as shown, in the central vertical plane of the trackway. The trolley wire, *d*, is suspended from the messenger cable *c*, at a uniform elevation above the trackway, by means of a smaller and preferably continuous cable *e*, arranged in zig-zag fashion as a “lacing” between the two, held by suitable fastenings, *y*, at its upper bights to the messenger cable above

and carrying at its lower bights "ears", *z*, by which the trolley wire is suspended below. The particular construction of these fastenings is not material to my present invention as many approved forms are in common use; and they may be spaced as far apart as the conditions of the particular installation require. It will be noted that as each "ear" engaging the trolley wire is suspended in a lower bight of the "lacing" cable, the divergent suspending portions of the lacing cable extend diagonally outward, and hang in such a position as to yield readily when the upward thrust of the traveling collector comes upon the ear. This yielding action is illustrated in Fig. 2, in which the normal position is shown in full lines and the position under upward pressure of the collector in dotted lines. The suspending system thus yields readily to the upward pressure when the crest of the traveling wire passes and practically eliminates all hammering and sparking and insures a smooth and uniform trolley action at all speeds. The structure thus possesses

throughout an elasticity unattainable by perpendicular hangers and is more economical in maintenance.

I claim as my invention and desire to secure by Letters Patent of the United States:

In a catenary suspension system for electric railways, a supporting or "messenger" cable; a trolley wire; a substantially continuous cable or wire interposed as the sole suspending element between said messenger cable and trolley wire arranged in zig-zag continuity; hooks or clamps fixedly connecting and supporting the said suspending element by its upper bights to the messenger cable; and trolley "ears" connecting and supporting the trolley wire upon and from the lower bights of said suspending element.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM ANDREW McCALLUM.

Witnesses:

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A. L. TILDESLEY.