T. VARNEY.

TROLLEY FOR ELECTRIC VEHICLES.

APPLICATION FILED OCT. 7, 1908.

932,656.

Patented Aug. 31, 1909.

2 SHEETS—SHEET 1.

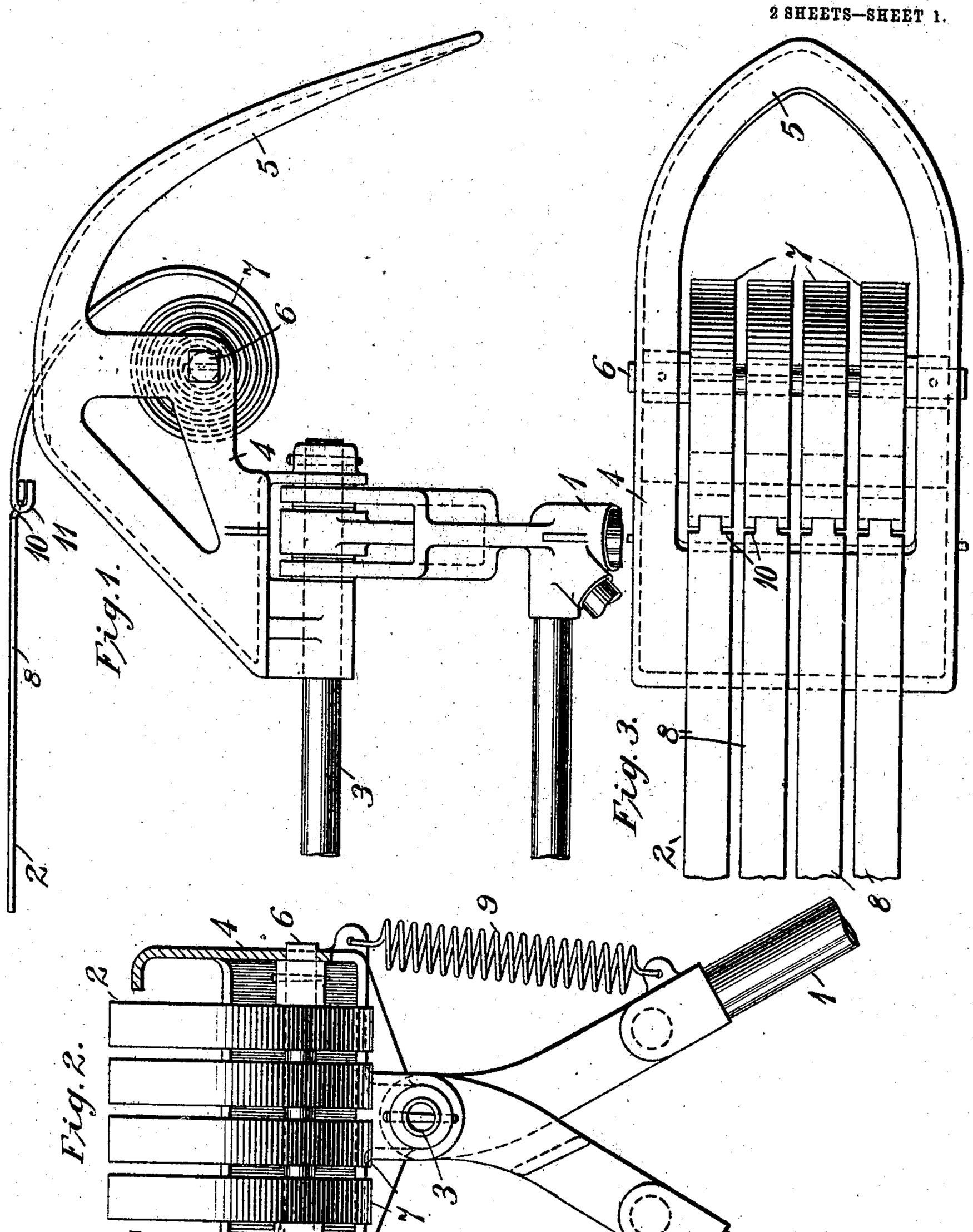

Fig. 1.

Fig. 3.

Fig. 2.

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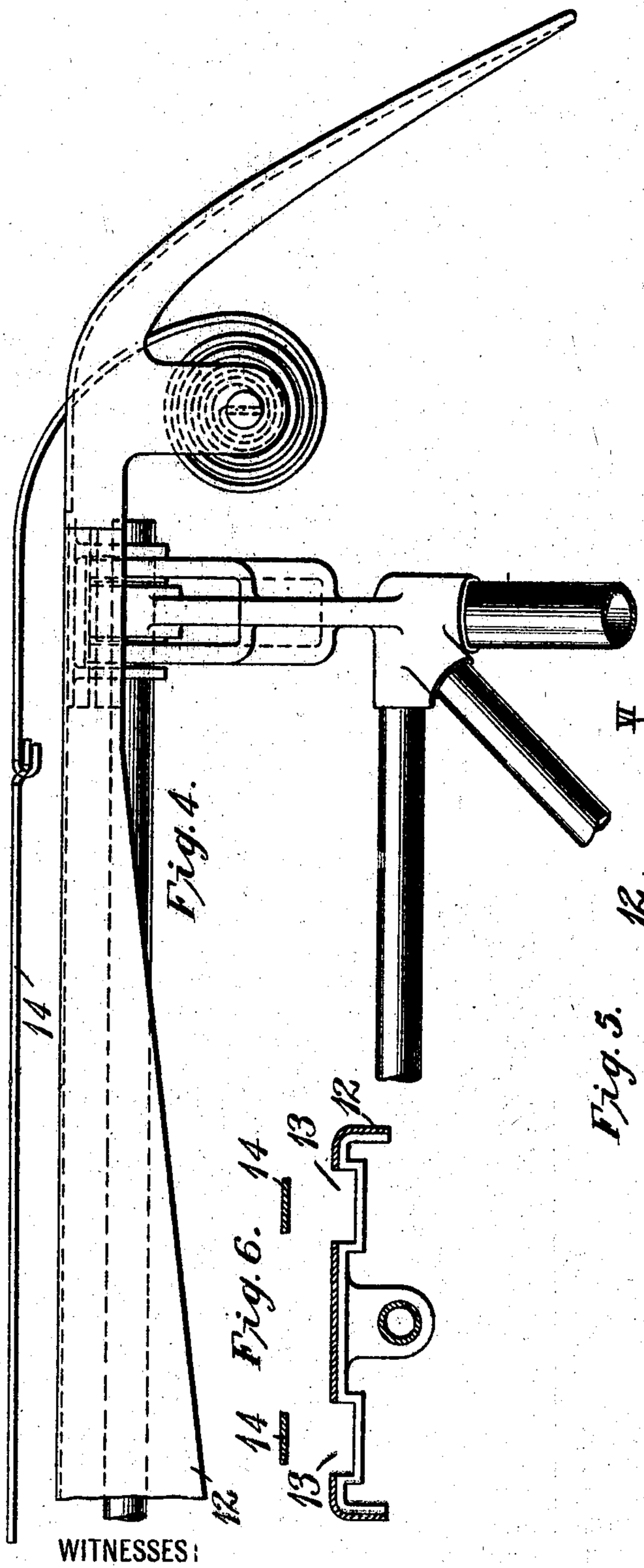

Fig. 4.

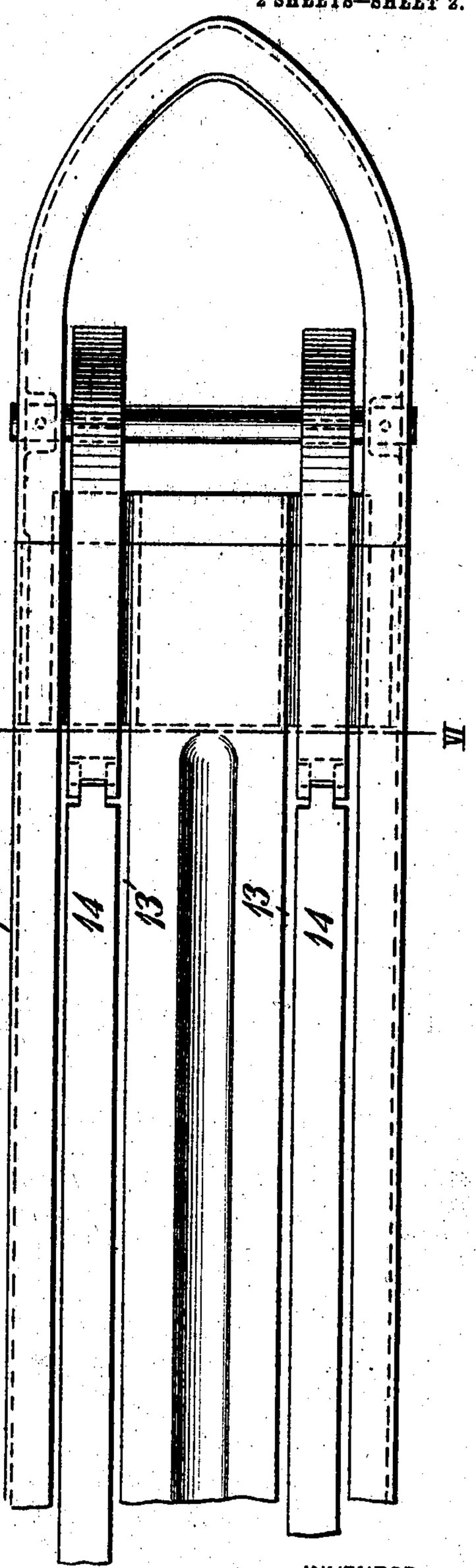

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

THEODORE VARNEY, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, OF EAST PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

TROLLEY FOR ELECTRIC VEHICLES.

932,656. Specification of Letters Patent. Patented Aug. 31, 1909.

Application filed October 7, 1908. Serial No. 456,566.

To all whom it may concern:

Be it known that I, THEODORE VARNEY, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Trolleys for Electric Vehicles, of which the following is a specification.

My invention relates to trolleys for electrically propelled vehicles, and it has for its object to provide a device of this character which shall be specially adapted to transmit electric power at relatively high voltages from a stationary line conductor to a vehicle operating at a high speed.

Trolleys having sliding or bow contact members have been found preferable to other types for high speed service, particularly where large amounts of electric power are transmitted at high voltages from a supply line through a single contact member. The contact devices of these trolleys have been usually held in engagement with the trolley line conductor by springs or by other suitable mechanical means, but, on account of the inertia of the moving parts which are in contact with the line conductor and the unavoidable irregularities in the suspension of the said conductor, such interruptions of contact have sometimes occurred that destructive electric arcs were produced.

According to my present invention, I provide an improved contact member the parts of which are relatively light and are so arranged as to be capable of independent contact with the supply line conductor and thereby minimize the tendency for the engaging parts to be separated on account of the aforesaid variations in the supply line conductor.

Figures 1, 2, and 3 of the accompanying drawings are, respectively, a side elevation, an end elevation with certain of the parts broken away and a plan view of a portion of a trolley having a contact member constructed in accordance with my invention. Figs. 4 and 5 are views similar to Figs. 1 and 3 which show a modified form of contact member having some of the features set forth in my copending application, Serial No. 366,499, the auxiliary contact shoes being constructed in accordance with my present invention. Fig. 6 is a sectional view on the line VI—VI of Fig. 5.

Referring to the drawings, with special reference to Figs. 1, 2, and 3, the device here illustrated comprises a pantograph or lazy tongs supporting structure 1 which is illustrative of any suitable means for supporting the contact members and is preferably constructed in accordance with Patent No. 879,267, granted to the Westinghouse Electric & Manufacturing Company, upon an application filed by Ray P. Jackson, and a contact member 2 comprising a plurality of independent resilient sections.

The pantograph supporting frame 1 is provided with a cross-rod or shaft 3 at its upper extremity upon which end castings 4 (only one of which is shown) are rotatably secured. The end castings are similar to each other and are provided with horn or guide projections 5 which serve the usual purpose of preventing the ends of the contact member from catching over the line conductor at the junction of two or more lines. The castings 4 are further provided with cross-rods or shafts 6 which are fixed to the walls of the casting near their ends so as to prevent rotation and to serve to support a plurality of spiral springs 7 the inner ends of which are secured to the rods and the outer ends of which are carried inwardly and upwardly, those on opposite ends of the assembled contact member being joined by resilient contact strips 8. The spiral springs are preferably made of steel strap and are spaced apart on the cross-rods so that the contact strips 8 are independently movable. The upper surfaces of the contact strips are kept substantially in a horizontal plane by springs 9 which connect the sides of the casting 4 with suitable points below it on the pantograph frame 1. The contact strips 8 are preferably constructed of galvanized steel ribbon or other suitable material which produces a minimum amount of friction with the trolley conductor. The strips or ribbons 8 are provided with notches 10 near their extremities and the ends of the spiral springs 7 are bifurcated and bent to form hooks 11 to engage said notches. Any suitable means may be employed for securing these parts together, in lieu of that illustrated in the drawings.

By constructing the contact member in the manner above indicated, the tendency

for the device to become entirely separated from the supply conductor during its normal operation is entirely avoided for the following reasons: first, the contact member, as a whole, is relatively light, so that its inertia is small; second, each contact strip is resiliently supported by independent spiral springs so that a number of independent contact devices are virtually provided and the possibility of separation of all of these members from the line conductor at one time is very remote; third, the contact strips or ribbons are themselves flexible so that they engage a relatively large portion of the surface of the supply conductor by conforming to its curved contour.

Referring to Figs. 4, 5, and 6, the contact member here shown comprises a punched or stamped metal contact shoe 12 preferably like that shown and described in my copending application, Serial No. 366,502, filed April 5, 1907, longitudinal slots or grooves 13 being provided in which resilient auxiliary contact members 14, similar to the strips 8 illustrated in Figs. 1, 2, and 3, are disposed. These auxiliary contact strips 14 are supported at a slight distance above the plane of the main contact shoe 12 when they are not in contact with the supply line conductor and are intended to follow the variations and irregularities in the line when the main shoe is temporarily separated from it by reason of its inertia and inflexibility.

My invention is, of course, not restricted to the specific structure shown in the drawings, and it will be readily understood that the number of contact units and the width of the flexible ribbon of which they are composed are immaterial.

I claim as my invention:

1. A contact member for electric vehicles comprising a supporting structure, a plurality of flexible conducting strips, and resilient means for supporting the strips substantially in the same plane under tension.

2. A trolley for electric vehicles comprising a supporting structure, a plurality of flexible conducting strips, and spiral springs interposed between the supporting structure and the strips.

3. A trolley for electric vehicles comprising a supporting structure and a plurality of resilient contact strips disposed parallel to each other and in the same horizontal plane under tension.

4. A contact shoe for trolleys comprising a movable supporting structure, a plurality of strips or ribbons of conducting material disposed in side-by-side relation upon said structure, and springs to which the ends of said strips are attached and by which they are resiliently supported.

5. A contact shoe for trolleys comprising a supporting structure comprising a rod or bar, end frames rotatably mounted near the extremities of the bar, and a plurality of flexible contact strips supported by and stretched between the end frames.

6. A trolley for electric vehicles comprising a supporting structure having a rod or cross bar, end frames rotatably mounted near the extremities of the bar, a plurality of flexible contact strips, and spiral springs interposed between the end frames and the ends of the strips for placing said strips under tension in the same plane.

7. A trolley for electric vehicles comprising a supporting structure, a main shoe contact member and auxiliary contact members comprising flexible contact strips disposed substantially parallel to said main member.

8. A trolley for electric vehicles comprising a main contact shoe and a plurality of auxiliary contact members each of which comprises a flexible contact strip or ribbon, and resilient means for holding the strips under tension in a plane substantially parallel to the plane of the main contact shoe.

9. In a trolley for electric vehicles, the combination with a supporting structure and a main contact shoe having longitudinal recesses, of auxiliary contact members each of which comprises a flexible conducting strip or ribbon, and spiral springs for placing the ribbon under tension, said strips or ribbons being disposed in a plane parallel to and slightly removed from the plane of the main contact shoe and directly over its longitudinal recesses.

In testimony whereof, I have hereunto subscribed my name this 21st day of Sept., 1908.

THEODORE VARNEY.

Witnesses.
WILLIAM SCHOAKE,
BIRNEY HINES.