W. KÖHLER.

CURRENT COLLECTOR FOR ELECTRICALLY PROPELLED VEHICLES.

APPLICATION FILED MAR. 17, 1910.

1,004,884. Patented Oct. 3, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

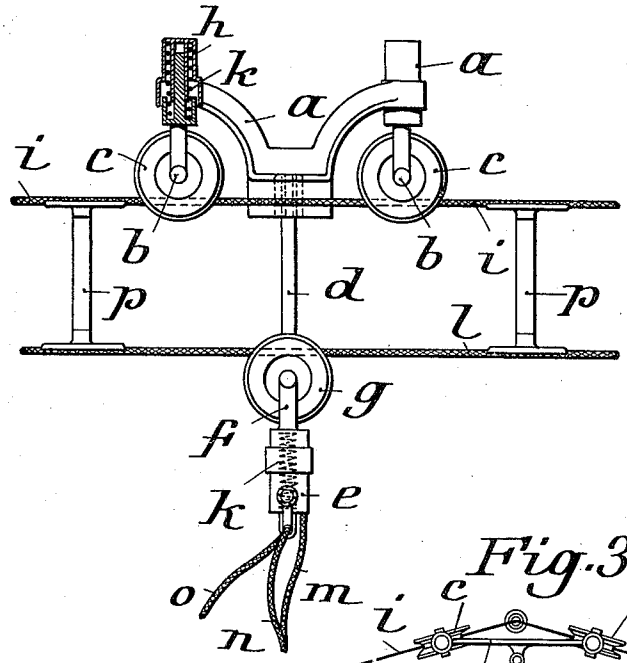


Fig. 3.

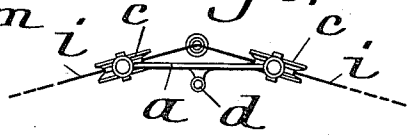
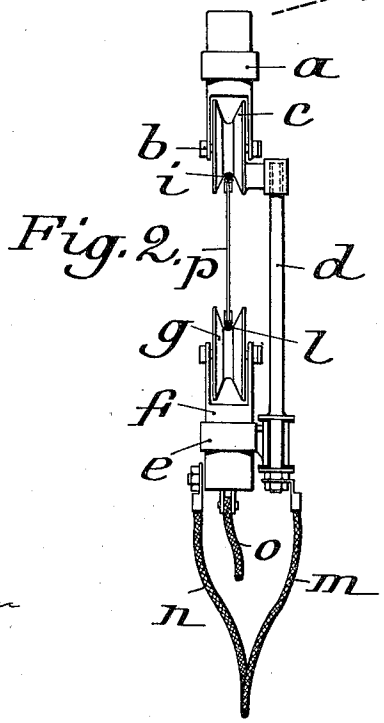


Fig. 2.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 4.

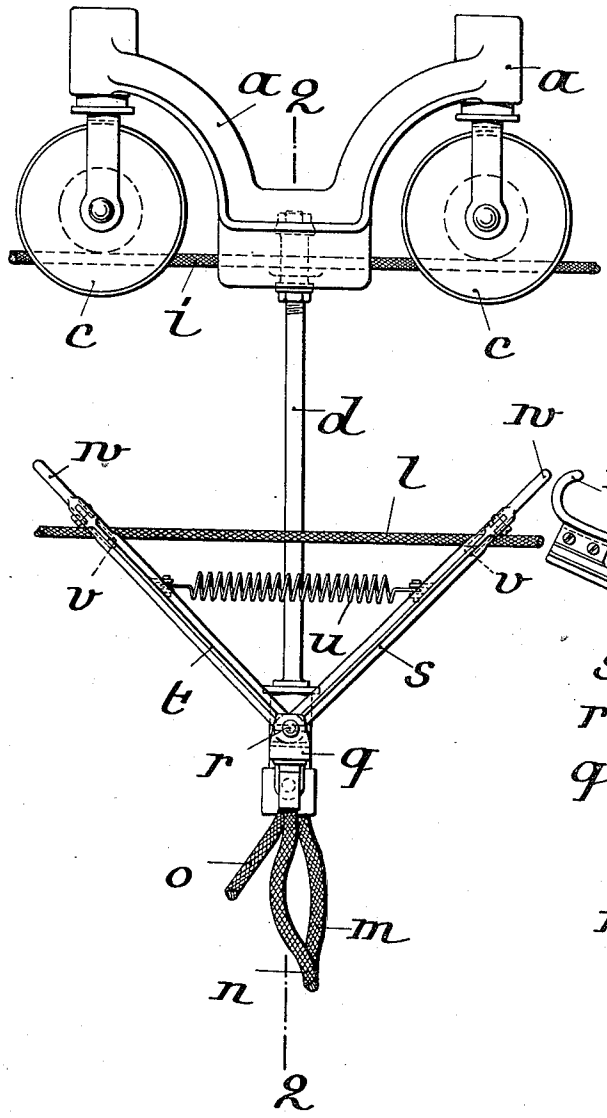
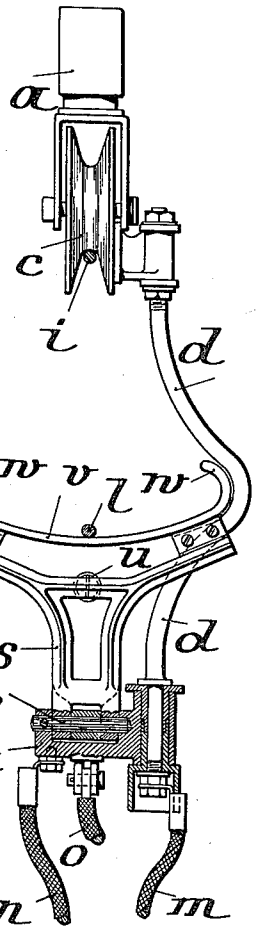


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLY KÖHLER, OF BREMEN, GERMANY.

CURRENT-COLLECTOR FOR ELECTRICALLY-PROPELLED VEHICLES.

1,004,884. Specification of Letters Patent. Patented Oct. 3, 1911.

Application filed March 17, 1910. Serial No. 550,010.

To all whom it may concern:

Be it known that I, WILLY KÖHLER, a subject of the German Emperor, residing at 41–43 Obernstrasse, Bremen, Germany, have invented new and useful Improvements in Current-Collectors for Electrically-Propelled Vehicles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention consists in an improved current collector for electrically propelled vehicles which do not run on a fixed track. The current collector must therefore be bi-polar and must allow of considerable lateral deviations of the vehicle from the line of the overhead wire. The construction of known current collectors of this kind differs according to whether the two overhead wires are side by side or one above the other.

The present invention relates to current collectors of the latter kind.

Current collectors are already known in which each contact roller runs on the upper side of the respective wire, the lower roller being preferably pressed against the lower wire by a spring so that it can follow any differences in distance between the two wires. In practice, it is necessary to load these current collectors with a dead weight so as to keep them in the working position; this involves disadvantages, the most important of which is that the total weight of the collector may become too great, thus subjecting the wires to dangerous strains. It has also been proposed to make the two contact rollers engage the wires from the outside, both being pressed against the wires by springs. This means alone, however, is not sufficiently certain in operation, because the smallest turning moment, such as may easily arise at starting, may cause a disengagement of the collector from the wires.

According to the present invention the collector is of the kind in which the rollers engage the wires from the outside and are pressed against them by springs, the upper contact consisting of two rollers situated one behind the other and each journaled about a vertical axis in a similar manner to a railway carriage bogie so that they can adapt themselves to all bends in the wires.

In the accompanying drawings the current collector constructed according to the present invention is shown in Figure 1 in side elevation partly in section and in Fig. 2 in end elevation. Fig. 3 is a diagrammatic plan showing the adaptation of the two upper rollers to a curve in the overhead wires. Fig. 4 is a side elevation and Fig. 5 an end elevation of a modification of my improved trolley.

The same letters of reference indicate similar parts in all the figures.

The bogie *a* has two arms which terminate in bell shaped sockets. A tube *h* is provided inside the socket to receive the stem of a fork *b* formed with a bearing carrying the roller *c*. A helical spring *k* presses the roller downward, that is, against the wire *i*. The spring is coiled about the vertical stem or spindle of the fork and is co-axial therewith.

A rod *d* is rigidly fixed in the middle of the bogie and carries at its lower end a socket *e*, similar to those carried by the arms *a*, but having its mouth turned upward; the bearing fork *f* carried in this socket is upwardly turned and is pressed upward by a spring *k* so that its roller *g* bears against the lower wire *l*. The rod *d* and the bracket carrying the lower socket *e* are insulated from each other.

The two current carrying cables *m* and *n* are connected with the rod *d* and the socket *e*, and to the latter is also fixed a rope *o* which tows the current collector.

Fig. 3 shows diagrammatically how the two upper rollers *c* adapt themselves to any deviation in the direction of the overhead wires.

In cases in which considerable lateral displacement of the car fed from my trolley is looked for, I prefer to employ the modification shown in Figs. 4 and 5 wherein instead of the roller running on the lower wire of the overhead conductor, there is used a sliding shoe. The advantage is thus attained that when there is a strong lateral pull, the lower wire is strained far less than in the construction illustrated in Figs. 1 and 2 because the current collector can swing out sidewise through a certain angle without danger of disengagement from the wire.

The rollers *c c* running on the upper wire a pivot for two arms *s* and *t* which are constructed as described above with reference to Figs. 1 and 2. The rod *d*, as shown in Fig. 4, is bent to one side outward and ex-

tends, with interposition of the necessary insulation, through a laterally projecting arm *q* which carries an eye and bolt for attachment of the draft rope *o* and a terminal for fixing the conducting cord *n*. The conducting cord *m* is connected, as in the aforesaid specification, with the lower end of the rod *d*.

In the arm *q* is inserted a pin *r* forming a pivot for two arms *s* and *t* which are connected together by a spring *u*. Each arm carries at its upper, free end a sliding shoe *v* made in the known manner of aluminium or other suitable soft metal, and preferably bent in such a manner that its contact surface will form part of a cylindrical surface whose axis coincides with the upper wire *i*. Inasmuch as the arms or bails *s*, *t* extend obliquely with reference to the axis of said cylindrical surface, the contact portions will be of elliptical shape. At both ends the shoe is preferably bent upward and inward as indicated at *w* so as to prevent it from being disengaged from the wire when the collector is pulled too far sidewise.

In any position of the current collector both shoes *v* are pressed against the lower wire by action of the spring *u*, and this spring enables them to be pulled so far apart by hand that the collector can be removed from the conductor.

In its working position as shown in Fig. 4 the shoe allows of a deviation of the current collector, without increasing the friction, through half the length of the shoe.

The certainty of operation of the trolley is increased if the two wires are kept apart by insulated rods *p* at suitable distances from each other.

In each of the constructions shown, the lower contact member is secured to the frame of the collector at a point midway between perpendiculars dropped from the axes of the upper contact rollers.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A traveling current collector comprising a frame, bearings carried by the upper portion of the frame and mounted to turn about vertical axes, contact-rollers arranged tandem-fashion and journaled in said bearings, coiled springs co-axial with said vertical axes and adapted to press said rollers downward, and contact means connected with the lower portion of the frame.

2. A traveling current collector adapted to travel on two superposed wires comprising a frame, contact means carried by the frame and adapted to engage one of said wires, bearings carried by said frame and mounted to turn about vertical axes, contact rollers arranged tandem-fashion and journaled in said bearings, and coiled springs co-axial with said vertical axes and arranged to press said rollers into firm contact with the other wire.

3. A traveling current collector adapted to travel on two superposed wires comprising a frame, contact means carried by the frame and adapted to engage one of said wires, a bearing carried by said frame and mounted to turn about a vertical axis relatively to said frame, a contact roller journaled in said bearing about an axis intersecting said vertical axis, and a coiled spring co-axial with said vertical axis and arranged to press said roller into firm contact with the other wire.

4. A traveling current collector comprising a frame, bearings carried by the upper portion of the frame and mounted to turn about vertical axes, contact rollers arranged tandem-fashion and journaled in said bearings, and a contact shoe connected with the lower portion of the frame, the contact surface of said shoe forming substantially a portion of a cylindrical surface whose axis coincides with the line connecting the contact points of the rollers.

5. A traveling current collector comprising a frame, contact rollers journaled tandem-fashion at the upper portion of the frame, and a contact shoe connected with the lower portion of the frame, the contact surface of said shoe forming substantially a portion of a cylindrical surface whose axis coincides with the line connecting the contact points of the rollers.

6. A traveling current collector comprising a frame, contact means at the upper portion of the frame, and a contact shoe at the lower portion of the frame, said shoe comprising two contact bails arranged at an angle to each other and a spring tending to diminish said angle.

7. A traveling current collector comprising a frame, contact means at the upper portion of the frame, and a contact shoe at the lower portion of the frame, said shoe comprising two contact bails arranged at an angle to each other and a spring tending to diminish said angle, the outer edges of said bails being curved upward and inward.

8. A traveling current collector comprising a frame, contact means at the upper portion of the frame, and a contact shoe at the lower portion of the frame, said shoe comprising two contact bails arranged at an angle to each other and a spring tending to diminish said angle, the contact surfaces of said bails forming substantially portions of a cylindrical surface whose axis coincides with the contact line of the upper contact means, and the outer edges of said bails being curved upward and inward.

9. A current collector adapted to travel on two superposed conductors, comprising a frame, rollers arranged tandem-fashion at

the upper portion of the frame and adapted to engage the upper conductor, and a lower contact member comprising two bails secured to the frame pivotally at a point midway between perpendiculars dropped from the axes of said rollers, and means tending to move said bails toward each other.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

WILLY KÖHLER.

Witnesses:
FRIEDRICH SCHMIDT,
FRIEDRICH HOYERNAUN.