No. 606,819. Patented July 5, 1898.

H. P. DAVIS.

CONTACT DEVICE FOR ELECTRICALLY PROPELLED VEHICLES.

(Application filed Apr. 6, 1896. Renewed Mar. 16, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 2.

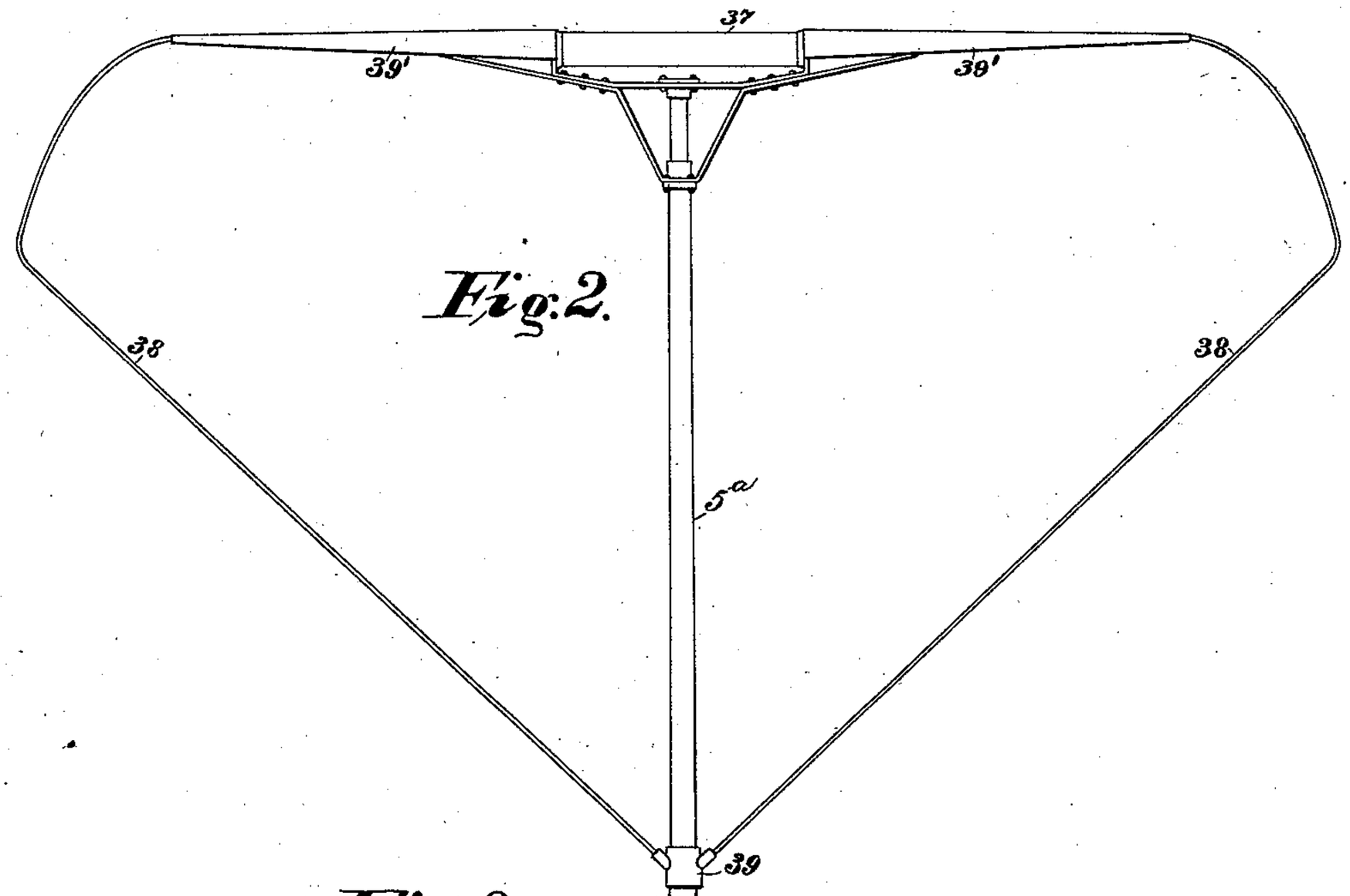

Fig. 3.

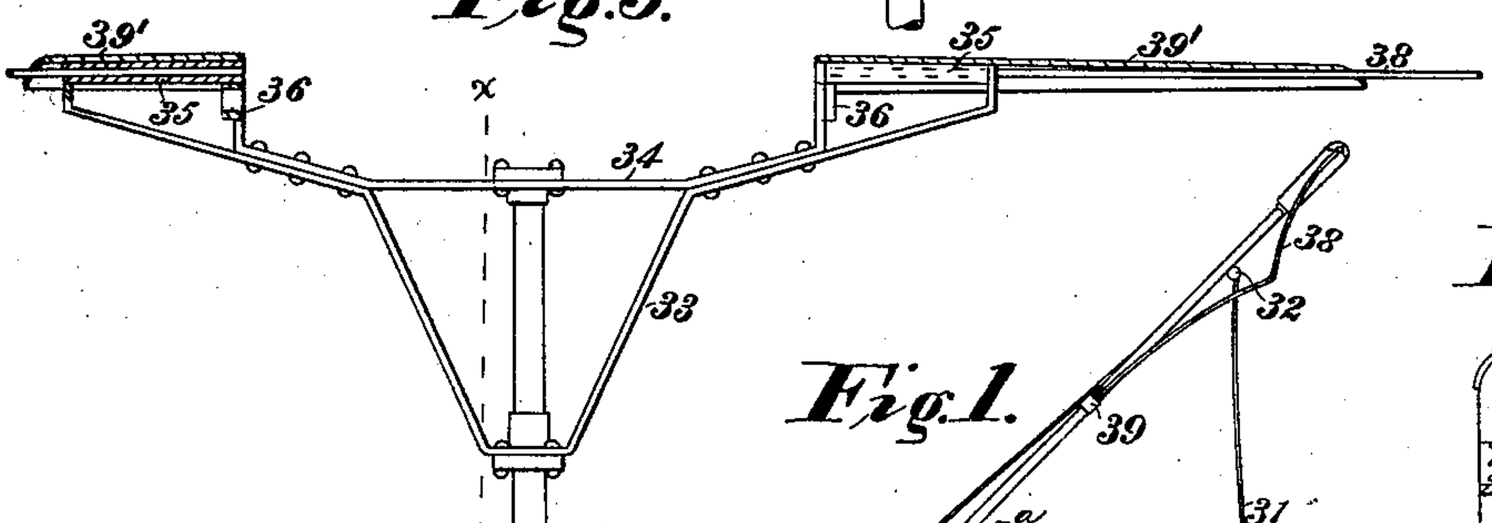

Fig. 1.

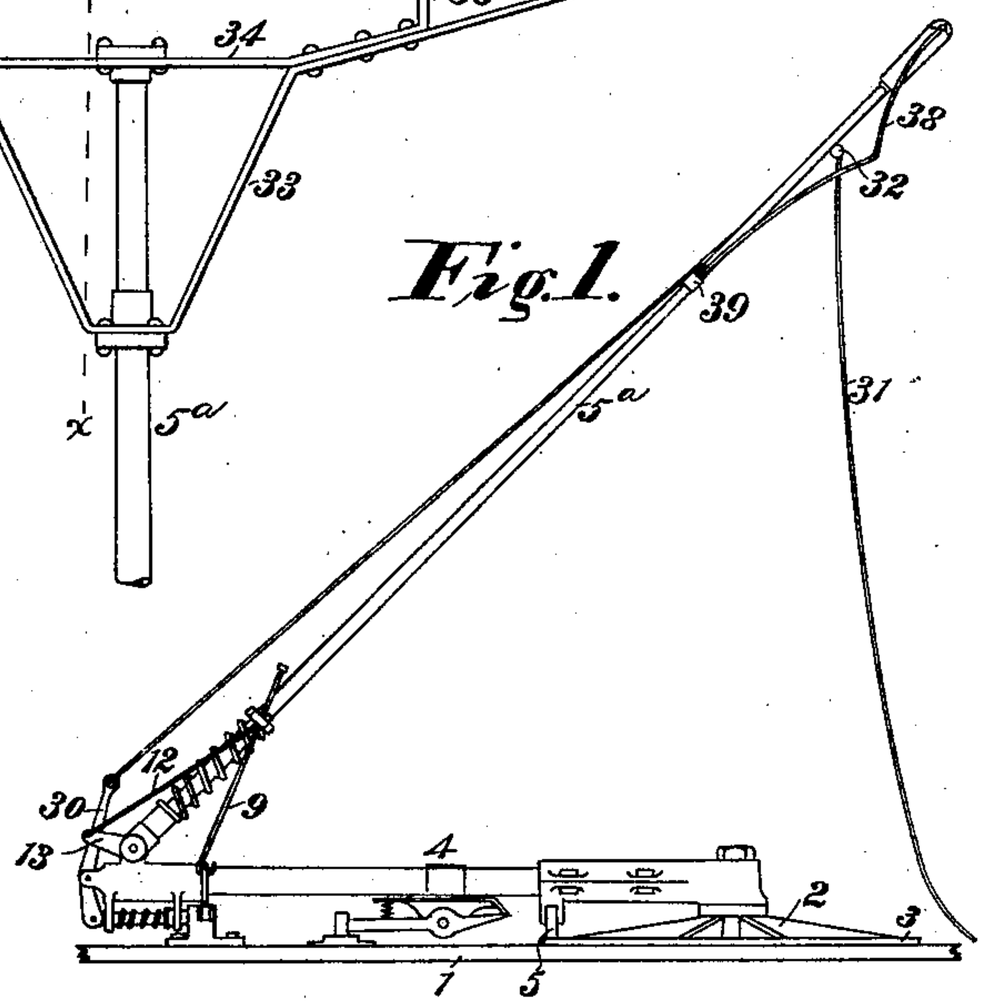

Fig. 4.

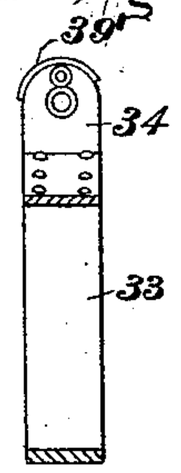

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Fig. 7.

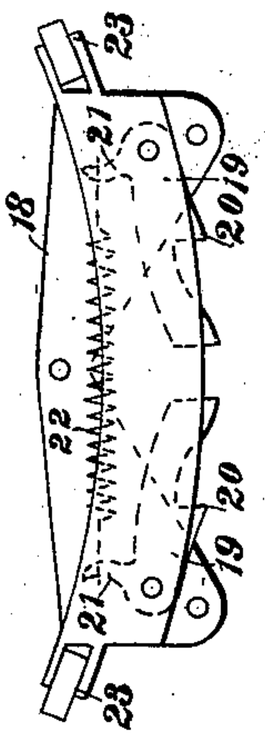

Fig. 5

Fig. 6.

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UNITED STATES PATENT OFFICE.

HARRY P. DAVIS, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, OF SAME PLACE.

CONTACT DEVICE FOR ELECTRICALLY-PROPELLED VEHICLES.

SPECIFICATION forming part of Letters Patent No. 606,819, dated July 5, 1898.

Application filed April 6, 1896. Renewed March 16, 1897. Serial No. 627,894. (No model.)

To all whom it may concern:

Be it known that I, HARRY P. DAVIS, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Contact Devices for Electrically-Propelled Vehicles, (Case No. 696,) of which the following is a specification.

My invention relates to apparatus employed in connection with electrically-propelled vehicles for making contact with overhead conductors, and particularly to that class of apparatus embodying extended contact devices having substantially no lateral movement with reference to the vehicle as distinguished from grooved contact-wheels supported so as to be movable laterally with reference to the vehicle in order to maintain a continuous contact with the supply-conductor.

The objects of my invention are, first, to provide a contact device which shall be as light as possible consistent with strength and durability and which shall be simple and easily constructed and the parts of which subject to wear may be readily replaced; second, to provide a simple and efficient means for elevating and supporting the contact device, and, third, to provide an efficient and reliable means for automatically locking the reversible supporting base or boom in working position.

In the accompanying drawings, Figure 1 is a side elevation of my current-collecting apparatus. Fig. 2 is a front elevation of the contact device, the lower portion of the supporting-arm being broken away. Fig. 3 is a view, partially in front elevation and partially in section, of the stationary portions of the contact device, parts being broken away. Fig. 4 is a vertical section taken on line $x\,x$ of Fig. 3. Fig. 5 is an enlarged side elevation of the boom and the lower part of the contact-supporting arm. Fig. 6 is a front elevation of the part shown in Fig. 5, the locking device and supporting-casting for the boom being omitted. Fig. 7 is a plan view of one of the devices for locking the boom in working position.

Reference being now had to the drawings in detail, 1 is a supporting-base, which may be the top of a car or a separate base-piece rigidly fastened thereto.

2 is a circular metal casting suitably fastened to the base-piece 1 and provided with an annular track 3.

4 is the boom, one end of which is pivoted to the casting 2 and is provided with a roller 5, which is in position to engage the annular track 3 and support the boom when moved in either direction from its normal position.

5^a is the supporting-arm for the contact device, the lower end of which is mounted upon a horizontal pivot or shaft having bearings in the outer end of the boom 4. Surrounding the lower part of the arm 5 is a coiled spring 6. This may be a single spring, or it may be made in two or more parts, as may be found most convenient in practice. The lower end of the spring 6 bears either against the end of a socket 7 or against a collar resting upon the upper end of such socket. Mounted loosely upon the arm 5, above the spring 6, is a head 8. A pair of rods 9, one on each side of the arm 5^a, extend through openings in the head 8, which are of sufficient size to enable the rods to have considerable lateral play therein, and these rods are provided at or near their upper ends with suitable stops, preferably nuts 10, which may be adjusted in position by means of screw-threads on the upper ends of the rods. The lower ends of the rods 9 are provided with hooks, which engage openings in bearing-arms 11, rigidly mounted on the boom 4. Two rods 12, one on each side of the arm 5^a, have a loose engagement by means of hooks at their lower ends with arms or lugs which are formed integral with or are rigidly connected with the end of the boom 4. The rods 12 extend through openings in the head 8 and are provided at or near their upper ends with nuts 14. The arms 13 should be of such a length and be placed at such angle that they will coöperate with the rods 12 and the head 8 against the action of the spring 6, so as to bring the arm 5^a to the maximum elevation desired in practice to press the contact device against the overhead conductor. The nuts 10 on the rods 9 are located at such a position that they will serve to check the

upward movement of the contact device before the arm 5^a reaches a vertical position. The extreme elevation to which the arm 5^a is limited may of course be anything that is desired. As the arm 5^a is always inclined more or less in the same direction with reference to the boom, it is obvious that when it is desired to reverse the direction of movement of the car it is necessary to reverse the contact device, its supporting-arm, and the boom. It is also necessary to lock the boom in operative position, so that it shall not accidentally move from its proper position. In order to effect this result, I provide a bolt 15, mounted in suitable lugs 16, depending from the lower side of the front end of the boom, so as to slide freely therein, and surround this bolt with a coiled spring 17, which normally presses the said bolt inward. I also provide two castings 18 of the same construction, one for each end of the car, which are suitably bolted to the base 1. Each casting has an upper and a lower plate spaced apart, and mounted between these plates are two locking-dogs 19. These dogs are pivoted to the casting at their outer ends and extend inward toward each other, a sufficient space being left between their inner ends to receive the end of the bolt 15. They are also constructed or provided with auxiliary teeth 20, with one of which the end of the bolt will engage and prevent the boom from swinging outward if it is not moved far enough to bring it into the central position, in which the end of the bolt will be received between the ends of the dogs. Each of the dogs is provided with a lateral projecting lug 21, and these lugs are connected by a coiled spring 22, which tends to throw the free inner ends of the dogs outward into position to be engaged by the bolt 15. A roller 23 is preferably mounted between suitable ears projecting from the ends of the casting 18 in such position as to be engaged by the lower edges of the arms 11 when the boom is swung into position, its movement into the central position being thus facilitated. These arms 11, in connection with the upper surface of the casting 18, with which they engage, afford a stable support for the front end of the boom, and thus tend to prevent any rocking motion.

Pivoted to a lug or lugs 24, projecting from the lower side of the boom, is a small lever or bar 25, on one end of which is mounted a roller 26. This roller 26 is pressed downward by means of a spring 27, interposed between the upper side of the bar 25 and the boom 4 or a suitable projection 28 on the lug 24. This roller 26 makes engagement with a stationary metal contact-piece 29 when the boom is locked in working position, and thus completes the electric circuit from the supply-conductor to the motors. The locking of the boom in the proper position before the car can be started is thus insured. This feature constitutes no part of my invention, but is shown and described as forming a part of the entire combination used in practice.

In order to unlock the boom and to reverse the position of the same, a two-armed lever 30 is pivoted to the front end of the boom, the lower arm having a suitable engagement with the outward end of the bolt 15. Attached to the upper arm of the lever is a cord 31, which extends upward along the arm 5 over a pulley 32 on the under side of the arm near its upper end and thence downward into position to be grasped by the motorman or conductor when it is desired to lower the contact device.

The normal position of the upper arm of the lever 30 with reference to the arm 5 is such that the latter may be lowered a considerable distance without withdrawing the bolt 15. When the arm is, however, brought nearly to a horizontal position, a further pull upon the cord 31 will withdraw the bolt 15 from between the inner ends of the dogs 19, and the boom may then be swung around and automatically locked in the reverse position. This specific means for lowering the contact device and unlocking the boom I do not claim as my invention.

The contact-head, which is carried by the upper end of the arm 5^a, comprises a sheet metal, preferably spring-steel, frame made in two parts 33 and 34, bent into the form shown most clearly in Fig. 3 of the drawings and riveted together, as there indicated. The horizontal portions of these pieces 33 and 34 are centrally perforated and slipped upon the upper end of the arm 5^a and held thereon by collars or other suitable means, as indicated. The upper and outer ends of these pieces 33 and 34 are also provided with openings, and in each pair of such openings is fitted a tube 35. In the ends of the part 34, just beneath the tubes 35, are openings in which are fitted suitable bearings 36 for the central contact-roller 37. The roller 37 is preferably provided with small beveled flanges at its ends, as indicated in Fig. 2. A small rod or tube 38 extends through each of the tubes 35 and projects laterally in an approximately straight line some distance therefrom, and is then curved downward and outward to form a guide to prevent entanglement of the contact-head with crossing or branching overhead wires, and thence extends downwardly and inwardly toward the supporting-arm 5^a, the lower ends of the two rods being received in and supported by suitable sockets in a collar 39, rigidly mounted on the arm 5^a. A curved and tapering piece of sheet metal 39′ is mounted upon and fastened to each of the tubes 35 or to the supporting-frame and projects outward nearly or quite to the bend in the rod 38. This constitutes a contact and wearing piece for engagement with the overhead conductor in case the roller 37 should not be in engagement therewith. In view of the fact that the arm 5^a is always occupying some position be-

tween horizontal and vertical in the same quadrant these wearing-plates 39 need not extend over appreciably more than ninety degrees of arc.

I claim as my invention—

1. A contact device for engagement with overhead electric conductors, comprising a roller, a supporting head or frame therefor, formed of two sheet-metal strips of different shape rigidly fastened together and provided with suitable bearings for the roller, laterally-extending guard and brace rods and curved, tapering, sheet-metal plates forming continuations of the contact-surface of the roller.

2. A supporting-arm provided at one end with a contact-head comprising a roller, a supporting-frame therefor constructed of a plurality of sheet-metal strips riveted together to form an open-work structure and provided with suitable bearings for the roller, laterally-extending guard and brace rods and curved sheet-metal plates supported by said frame and brace-rods and constituting continuations of the contact-surface of the roller.

3. The combination with a contact-supporting arm, a reversible support to which said arm is pivoted or hinged so as to move in a vertical plane and a coiled spring surrounding said arm near one end thereof, of a freely-movable head mounted on said arm above the spring, tension-rods extending from said head to the reversible support and check-rods extending from said support through the head and provided with stops for limiting the upward movement of the supporting-arm.

4. The combination with a contact device for engagement with overhead conductors, a supporting-arm therefor pivoted or hinged to move in a vertical plane, a supporting-base for said arm pivoted to swing in a horizontal plane, a coiled spring surrounding said arm near the lower end thereof, a movable head mounted on the arm above the spring, a pair of tension-rods extending from said head to the horizontally-movable supporting-base and at an angle to the supporting-arm, and a pair check-rods loosely fastened at one end to the horizontally-movable supporting-base, extending through the movable head at an angle to the supporting-arm and provided with stops for engagement with said head to limit the upward movement of the supporting-arm.

5. A reversible support for electric-railway contact devices provided with a locking-bolt, in combination with a locking-head comprising a pair of dogs extending inwardly toward each other and means for yieldingly holding said dogs in position to be engaged by the locking-bolt.

6. A reversible support for electric-railway contact devices provided with a spring-actuated locking-bolt at one end thereof, in combination with a stationary locking-head comprising a pair of pivoted dogs spaced apart for the reception of the locking-bolt between their inner ends and provided with auxiliary projections or teeth for engagement with the end of the locking-bolt.

7. A locking-head comprising a casting having an upper and a lower plate spaced apart, a pair of double-toothed dogs pivoted between such plates and projecting inwardly toward each other, and means for yieldingly retaining them in their normal position.

8. A locking-head comprising two plates separated by an intervening space, a pair of dogs pivoted in said space and projecting inwardly toward each other, and a spring holding said dogs yieldingly in normal position.

9. A reversible support for electric-railway contact devices, in combination with mechanism for locking said support in position, portions of said mechanism being located respectively on the car-roof and on the reversible support and each having a movable member.

10. A reversible support for electric-railway contact devices having a lock or latch member which is actuated to release the support, in combination with a member attached to the car-roof which is actuated to lock the support in position.

11. A lock for reversible current-collecting devices comprising a pair of movable dogs and a coöperating bolt.

12. A lock for reversible current-collecting devices comprising two coöperating members each of which has a movable part and a spring against which said movable part rests.

13. Means for locking a reversible support for electric-railway contact devices in position comprising jaws and a coöperating, spring-actuated bolt, in combination with means for withdrawing the bolt from the jaws.

14. The combination with a reversible support for electric-railway contact devices, of a spring-actuated locking member supported thereby and two stationary members having spring-actuated parts with which said first-named member engages.

15. A reversible support for electric-railway contact devices in combination with automatically-operated means for locking the support in either of two positions and means connected with the contact device for unlocking said support.

In testimony whereof I have hereunto subscribed my name this 1st day of April, A. D. 1896.

HARRY P. DAVIS.

Witnesses:
WESLEY G. CARR,
HUBERT C. TENER.