No. 713,274. Patented Nov. 11, 1902.

F. M. ASHLEY.

ELECTRIC RAILWAY.

(Application filed Feb. 26, 1898.)

(No Model.) 2 Sheets—Sheet 1.

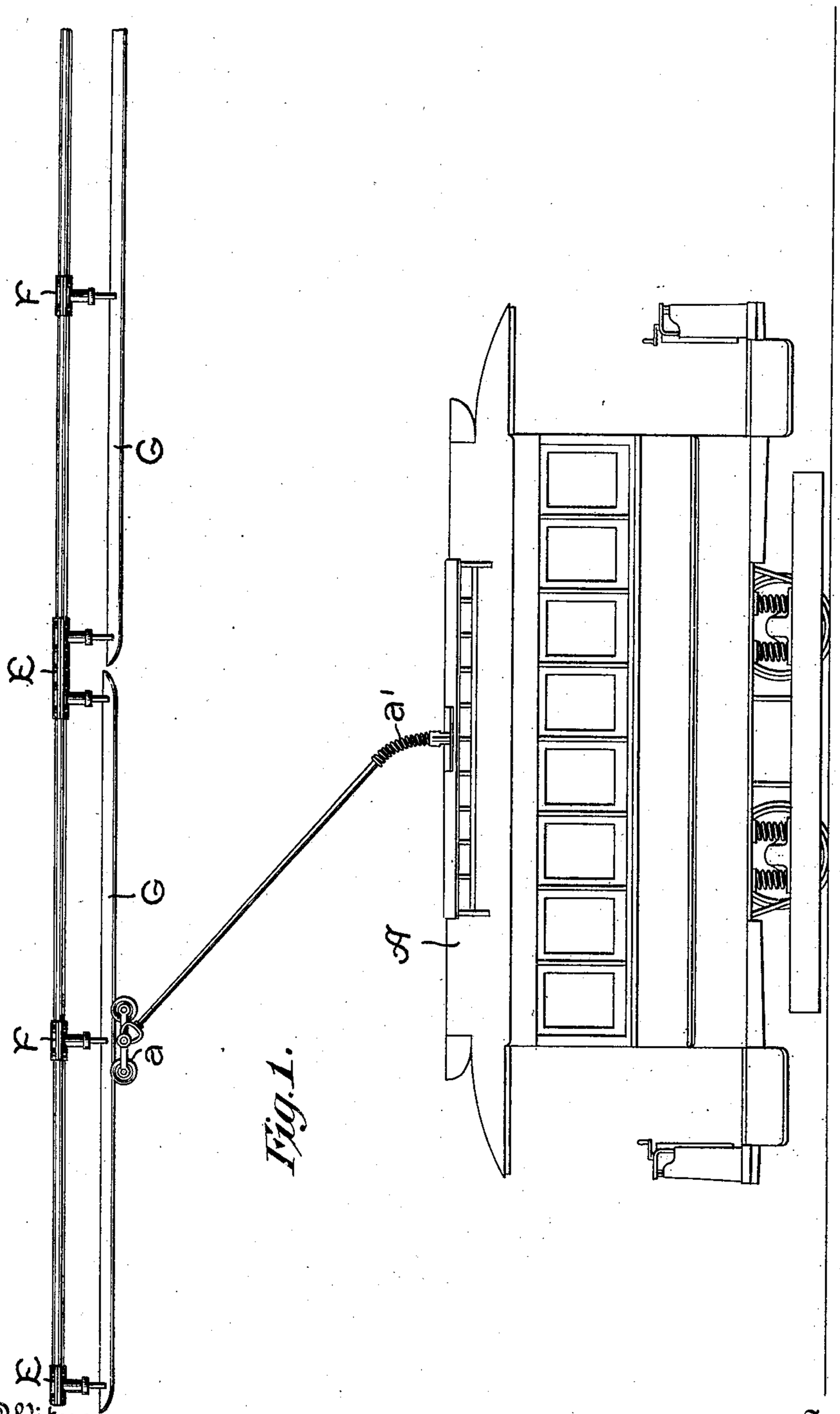

Fig. 1.

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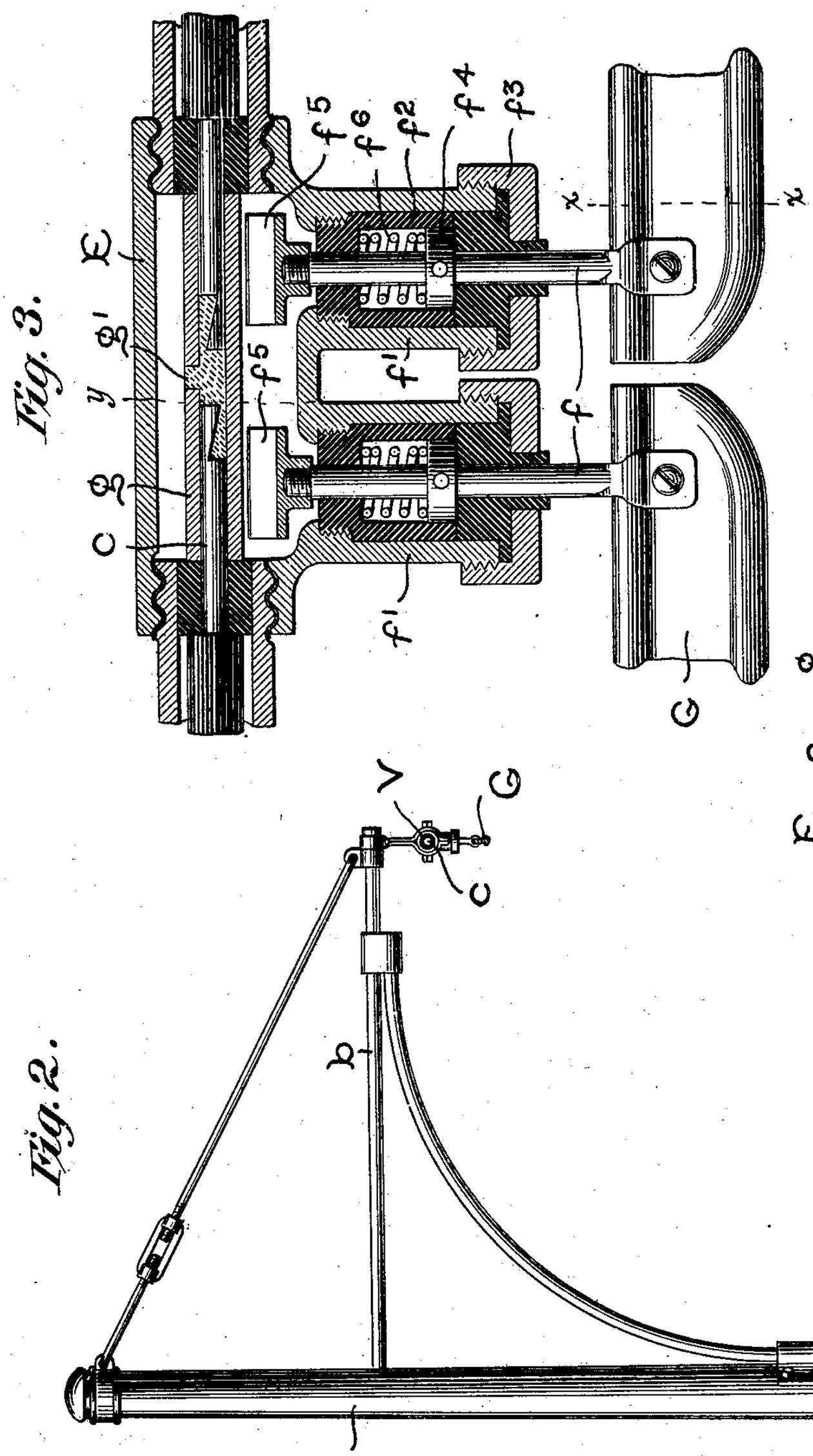

Fig. 3.

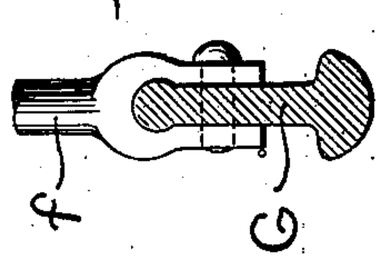

Fig. 5.

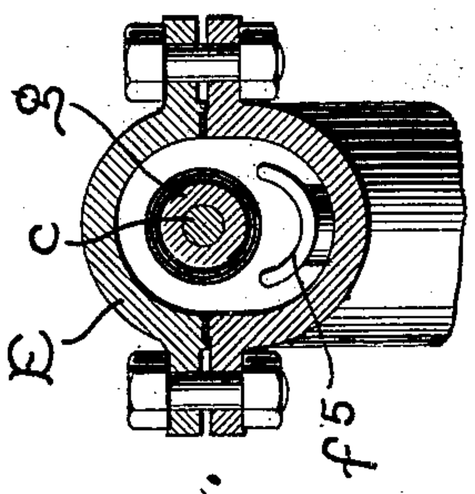

Fig. 4.

Fig. 2.

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UNITED STATES PATENT OFFICE.

FRANK M. ASHLEY, OF BROOKLYN, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 713,274, dated November 11, 1902.

Application filed February 26, 1898. Serial No. 671,794. (No model.)

To all whom it may concern:

Be it known that I, FRANK M. ASHLEY, a citizen of the United States, residing at Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Electric Railways, of which the following is a specification.

This invention relates to electric railways of that class in which the current is conveyed to the vehicles on the track by means of conductors supported overhead along the roadway.

The invention consists of the combination of a main insulated conductor and an exposed sectional working conductor, both supported overhead and arranged in close proximity to each other, and means for successively energizing the sections of the exposed conductor as the car moves along in order that it may be continuously supplied with propelling-current.

The details of the invention will be described with reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a car and a portion of the overhead structure. Fig. 2 is an elevation of one of the supporting-masts. Fig. 3 is a sectional detail view of a coupling and a cut-out in the overhead conductors. Fig. 4 is a section on line *y* of Fig. 3, and Fig. 5 is a section on line *x x* of Fig. 3.

Referring to the drawings by letter, A represents an electric car equipped with the trolley *a*, to which are attached suitable devices, such as the spring *a'*, tending to force it into a vertical position. Along the railway are placed a line of poles or masts B, having strong bracket-arms *b*, upon the extremities of which is supported a line of rigid pipe V. The pipe may be of iron or other metal or material which is of sufficient strength to withstand wind-pressures or heavy weights which may by accident or otherwise be imposed upon it. This pipe will contain a continuous copper conductor *c*, which will be thoroughly insulated by means of rubber or any of the well-known materials used for such purposes. The pipe is made in sections, which are connected together by couplings E and F. Associated with this pipe and continuous conductor is a sectional exposed working conductor G, which extends along underneath the pipe and is supported thereby. The sections are made, preferably, about the length of a car, and against them the trolley carried by the car impinges. The sectional conductor is in the form of a rail, as indicated in Figs. 3 and 5, with a broad contact-surface along its lower edge. It is supported by short rods *f*, extending upward through downwardly-projecting boxes *f'*, formed upon the couplings E and F. These boxes are lined or bushed with insulating material f^2 and closed at their lower ends by caps f^3, through which the rods project. Inside of the box the rods are provided with tight disks or shoulders which rest upon shoulders in the box, thereby preventing the rods from falling through under the weight of the sectional conductor. The upper ends of the rods *f* project into the main portion of the couplings and are there provided with U-shaped contact-pieces f^5, located immediately below the main conductor as it passes through the coupling. Springs f^6 are interposed between the disks f^4 and the upper ends of the boxes, which permit the rods to move upward and make contact with the main conductors and when released force the rods downward again and into the normal position illustrated.

In the main portion of the coupling it may be necessary to splice the main conductor in order to assemble the parts, and I prefer to do this by means of a copper sleeve *g*, into the opposite ends of which the ends of the conductor are passed and are held therein by means of lead or solder, which is poured into the middle portion in a liquid state through an opening *g'*. In order to make a tight union, the ends of the wire may be undercut, as shown, so that when the soldering metal becomes hard it forms a lock. The copper sleeve compensates for the increased resistance usually caused by a joint and at the same time furnishes a large surface of contact for the pieces f^5.

Each section of the conductor G may be supported at two or more points, depending upon the length and rigidity of the section; but each point of support should be similar in construction to that above described and illustrated in Fig. 3. Both ends of the

section should be supported, and consequently it is economical to use a single coupling E for the abutting ends of any of the two sections; but the intermediate supporting-points may consist of single couplings equivlent to one-half of that shown in Fig. 3.

As the car moves along the pressure of the trolley against the under side of the sectional conductor forces the section with which it is in contact upward until its contact-pieces f^5 are in connection with the main conductor. This delivers current to the section through the rods f and to the motor on the car. As each section is passed it falls by gravity, aided by the springs f^6, and breaks connection with the main conductor in the pipe. The trolley is preferably constructed with two or more wheels arranged one ahead of the other in order that contact may be made with one section before it leaves another, and thus maintain a continuity of the current and prevent sparking.

It will be observed that my invention provides an overhead system without any exposed energized conductors, and the liability to give shock to persons and animals or to cause fires is reduced to the minimum. Furthermore, if another electric conductor becomes crossed with my overhead structure it will not become charged with the current which it carries. The rigidity of the structure is a feature also, as it will stand severe shocks and strain from any source.

Having thus described my invention, I claim—

1. The combination with a main overhead insulated conductor having exposed portions and inclosed in a suitably-supported pipe-line having openings opposite the exposed portions, of a sectional exposed overhead conductor, the sections of which are movable and normally disconnected from the main conductor, and a trolley carried by the car and adapted to engage with said sections to move them into engagement with the exposed portions of the overhead main.

2. The combination with a main overhead insulated conductor having exposed portions and inclosed in a suitably-supported pipe-line having openings opposite the exposed portions, of a sectional exposed conductor supported thereby, the sections of which are vertically movable and normally electrically disconnected from the main, and means for establishing electrical communication between the main conductor and the successive sections of the exposed conductor.

3. In an electric railway, the combination of a main insulated conductor located overhead and inclosed in a rigid pipe, a sectional exposed working conductor supported thereby, contact devices carried by the sections of said working conductor, and adapted to make contact with the main conductor, and means carried by a car for moving said sections of the exposed conductor to make and break the electrical connection between that and the main conductor, in the manner described.

4. In an electric railway, the combination of a main insulated conductor located overhead and inclosed within a rigid pipe, a coupling connecting the sections of pipe together a splice in the main conductor located in the coupling and surrounded by a sleeve of conducting material, a sectional exposed working conductor supported by the pipe, and having attached to it branch conductors which lead through the coupling and are adapted to make contact with the sleeve of the main conductor located therein, substantially as described.

5. The combination with an overhead main conductor, inclosed in a suitably-supported pipe-line, of couplings for the ends of the pipe, contact-boxes depending from said couplings, insulating-bushings for said boxes, contacts adapted to be moved into engagement with said main, and service-conductor sections suspended from said contacts.

6. An insulated conductor, comprising a series of sections having their ends secured inside a hollow cylinder of copper, a pipe-line inclosing the conductor, couplings for the pipe-sections, which couplings inclose the copper cylinder and have lower openings, contact-pieces adapted to be moved to engage the copper cylinders and passing through the openings in the couplings, and service-conductor sections suspended from the contacts.

7. In an electric railway, the combination with a structure above the roadway, a pipe-line supported thereby, an insulated main conductor in the pipe-line, service-conductor sections suspended from said pipe-line, and normally disconnected from the main, and a trolley carried by the car and adapted to force said sections into contact with the main conductor.

In witness whereof I have hereunto set my hand this 13th day of November, 1897.

FRANK M. ASHLEY.

Witnesses:
WM. A. ROSENBAUM,
HARRY BAILEY.