No. 612,068. Patented Oct. 11, 1898.

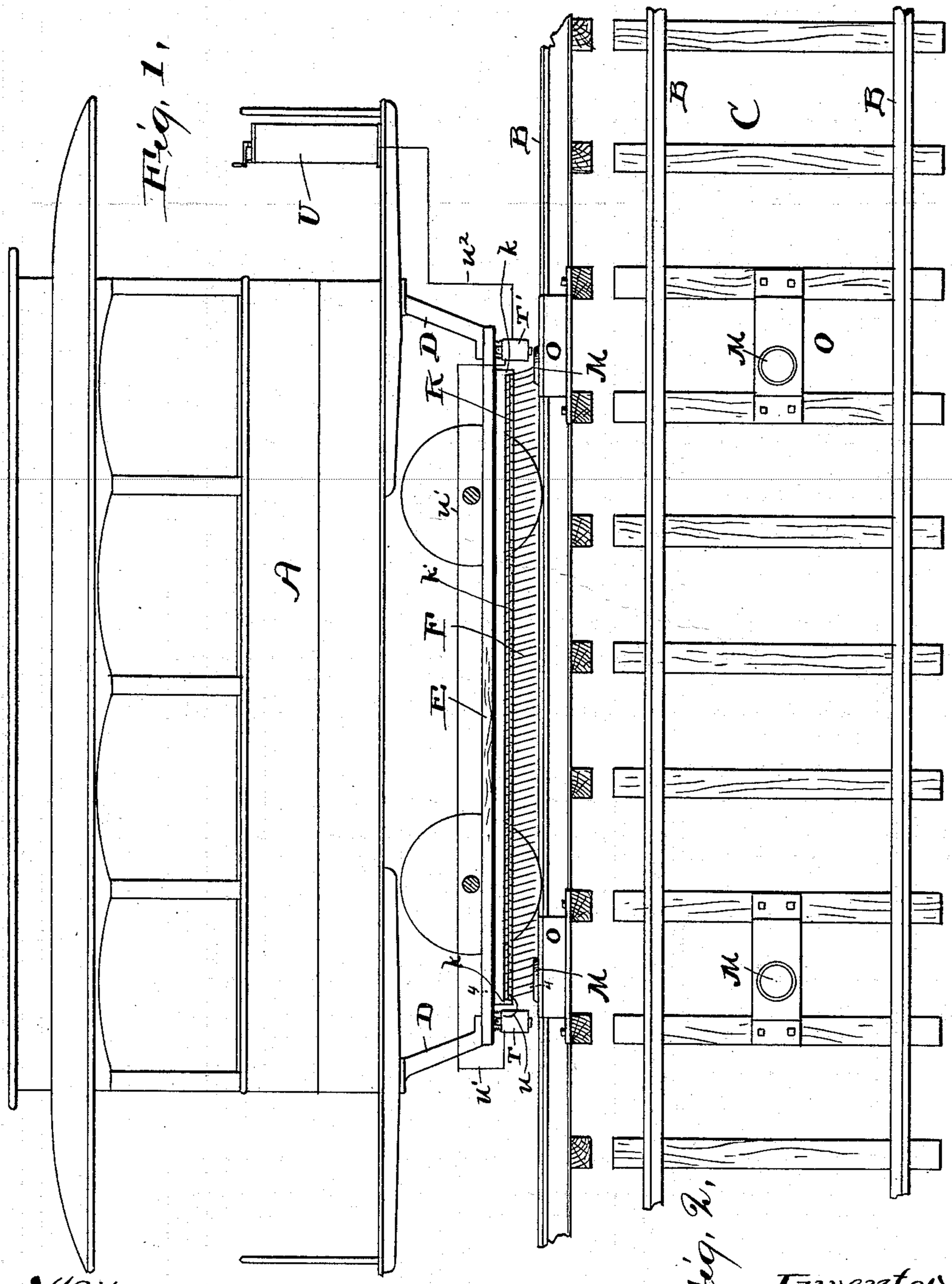
F. D. SWEET.

ELECTRIC RAILWAY.

(Application filed Nov. 22, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



Witnesses:
E. B. Gilchrist
Philip C. Knowlton

Fig. 2.

Inventor:
Frederick D. Sweet
By his Attorneys
Thurston & Bates

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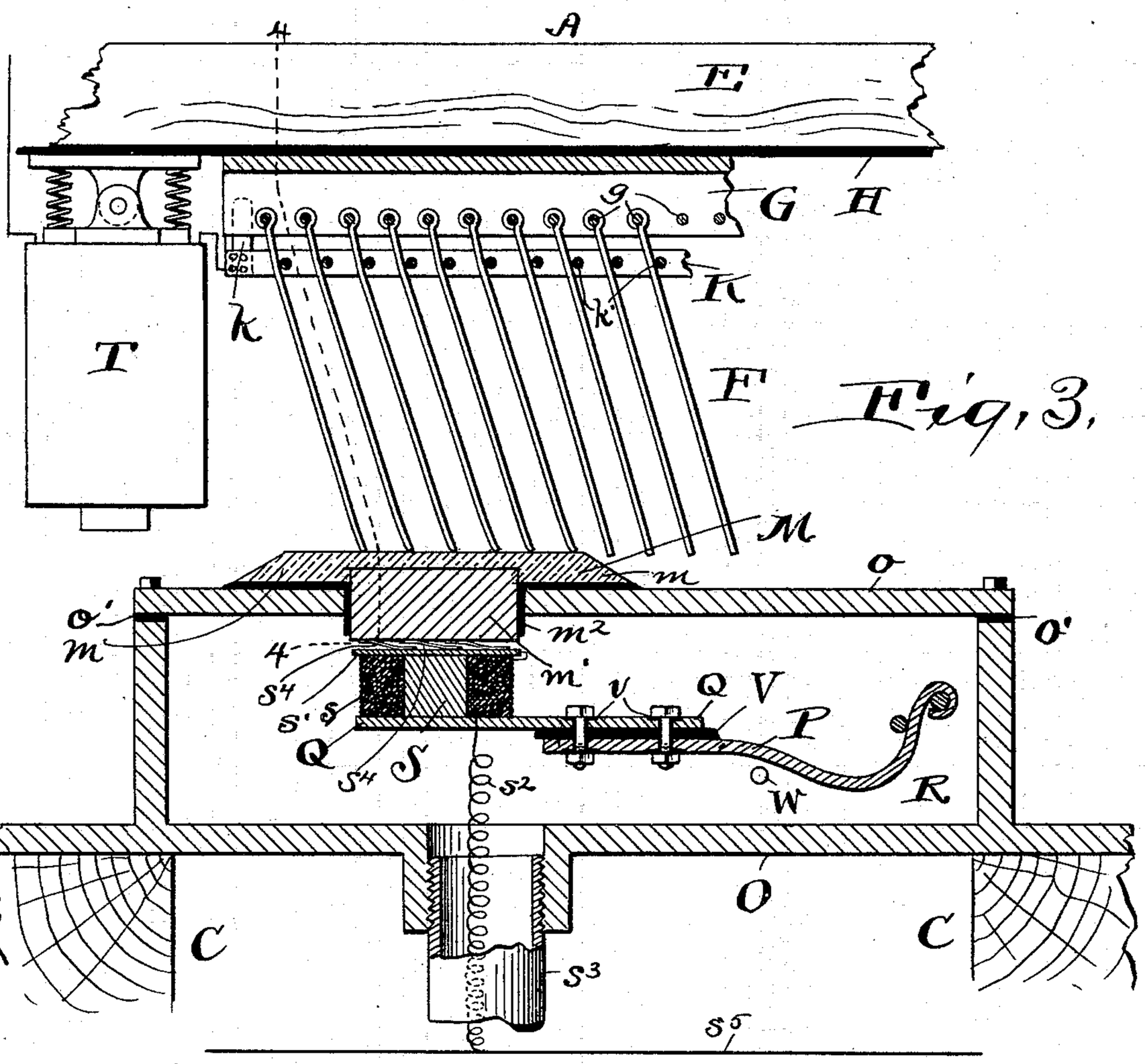


Fig. 3.

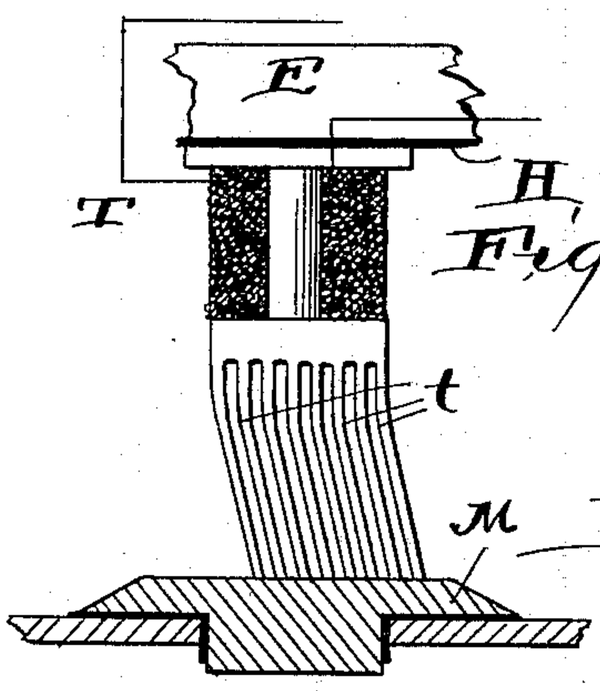


Fig. 5.

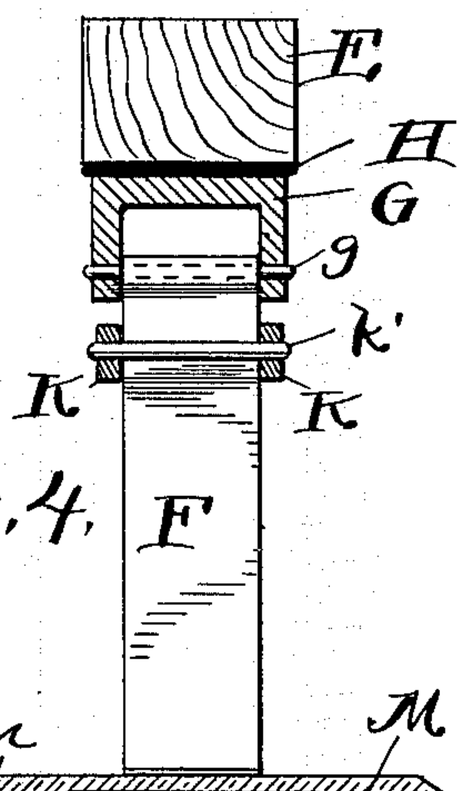
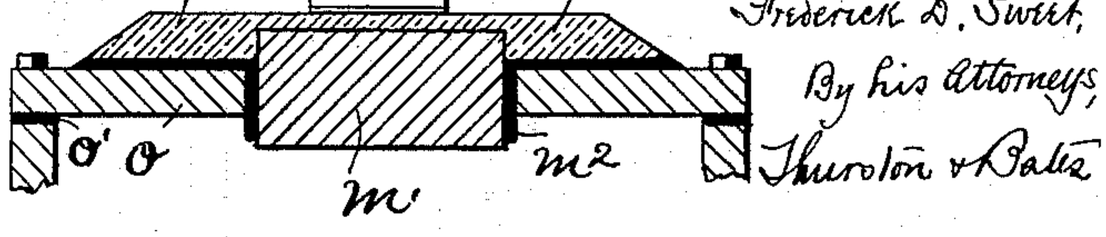


Fig. 4.



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Inventor,
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UNITED STATES PATENT OFFICE.

FREDERICK D. SWEET, OF ELYRIA, OHIO.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 612,068, dated October 11, 1898.

Application filed November 22, 1897. Serial No. 659,415. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK D. SWEET, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented a certain new and useful Improvement in Electric Railways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention is for a system of distribution of an electric current generated at a central station to traveling cars. Its object is to dispense with continuously-live exposed conductors, whether above or beneath the car, and to provide simple and efficient means whereby completely-inclosed terminals may be connected with contact-plates when the car is in proper relation to those plates to receive current therefrom, but will be otherwise disconnected.

The invention consists of the means employed for rendering such operation efficient and certain and not liable to be interfered with by moisture or other disturbing causes, as hereinafter described, and definitely specified in the claims.

In the drawings, Figure 1 is a side elevation of a car and the means for supplying the electric motor on the car with current from the contact-plates. Fig. 2 is a plan of the road-bed, showing the contact-plates. Fig. 3 is a vertical central longitudinal section through one of the stationary boxes carrying a contact-plate and a portion of the car above the same. Fig. 4 is a substantially vertical transverse section through the stationary contact-plate and the portion of the car which carries the contact-strips, being on the line 4 4 of Figs. 1 and 3. Fig. 5 is a detail view, in sectional side elevation, of a modified form of magnet carried by the car, showing the same in position on a contact-plate.

The same reference-letters designate the same parts in each of the several figures.

Referring to the parts by letters, A represents the car carrying the motors and traveling upon rails B, which are shown as girder-rails supported on ties C. Extending longitudinally of the car, beneath the same, is the beam E, made preferably of wood and supported by suitable brackets D.

The beam E carries contact strips or brushes F through the following instrumentalities: On the under side of the beam E is secured a channel-shaped bar of metal G, a strip of insulating material H lying between this channel-bar and the beam E. Journaled on pins *g*, which extend across the channel-bar, are the contact strips or brushes F. On each side of these brushes, a little below their pivots and supported by brackets *k*, extending downward from the channel-bar, are strips K. Extending transversely from one of these strips to the other are pins *k'*. The brushes F hang vertically downward between these pins *k'* when the car is at rest, but when the car is moving trail to the rear, owing to the resistance of the air, as shown in Figs. 1 and 3, and brush along the top of the stationary contact-plates M, located at intervals along the track. These contact-plates, which, as shown, are between the rails of the track and extend up into the path of the lower end of the brushes, are placed at intervals less than the length of the car, and when the car is above them they are adapted to form part of a conductor leading to the car, as will be presently described. These contact-plates M form rub-plates having a smooth surface, so that in going around curves the brush can travel laterally upon them.

Referring now more particularly to Fig. 3, O represents a box suitably secured to the ties C. The upper side of this box is formed by the plate *o*, preferably insulated from the sides of the box by strips *o'*, lying on the top of those sides. The contact-plate M is carried by this plate *o*, being also insulated from it by the interposed insulating material m^2. This plate M is composed of an upper rubbing-surface *m* and a projection *m'*, which extends down into the box, as shown. This projection should be of iron, and the whole plate may be made of one integral piece of iron, or the rubbing-surface may, if desired, be of other material and electrically connected with the iron projection. This latter construction is the form shown in the drawings,

where the rubbing-surface is of material which will not rust, as brass.

Suitably secured within the box O is a movable arm P, which is composed of a spring-arm R and a bar Q, bolted to the same, but insulated from it by the insulating-strip V and the insulating-brushings *v*. The bar Q extends under the projection or boss *m'* and has extending upward from it, beneath the center of that boss, the iron core S. Surrounding this core is a magnet-coil *s*. One end of this coil is connected to a plate *s'*, preferably of brass, carried at the top of the core, and the other end is connected, by means of a conductor s^2, extending down through a pipe s^3, to the main conductor s^5. Suitable contact-strips s^4 are carried by the plate *s'*, whereby when the free end of the arm P, with its magnet, is elevated the strips contact with the lower surface of the boss *m'*, but when the arm descends said strips are out of contact with the boss. A pin W furnishes a suitable stop for the descent of the arm.

T or T' represents a magnet of any suitable construction carried by the beam E on its under side. As shown in Figs. 1 and 3, this magnet is capable of longitudinal play to swing out of the way of obstructions on the road-bed. There are two of these magnets, one at each end of the series of contact-brushes. The magnets form part of the electric circuit from the contact-brushes to the controller and may be in series or parallel, as desired. I have shown them in series, the current passing from the brushes to the pins *k'* and bars K, from the latter via the conductor *u* to the magnet T, thence via the conductor *u'* to the magnet T', thence via the conductor u^2 to the controller U. From the controller the current passes to the motors and from them to the rails and ground.

Supposing the car to receive an initial current in starting, the magnets T and T' become energized, and as one of these passes over the plate M magnetic attraction acts upon the iron core S, which becomes a movable armature and is drawn upward until the strips s^4 contact with the under side of the boss *m'*. Thereupon a circuit is established from the main conductor s^5 through the said contact-strips to the plate M and from thence through the brushes F to the controller. This current flowing through the coil *s* energizes the core S, which finds a stationary armature in the iron portion of the plate M, and therefore is retained in its elevated position so long as the current continues to flow. As soon as the current is opened by the brushes passing off of the plate M the core S loses its magnetism, and it descends by gravity until the strips s^4 are out of contact with the boss *m'*. The controller when it entirely disestablishes the circuit through the motor leaves a circuit to the ground through great enough resistance so that no material part of the current is wasted, while enough of the current is kept flowing through the magnets T and T' and through the successive coils *s* to cause the latter to become elevated and to remain so until the car has moved past.

If desired, a small storage battery may be carried by the car for supplying enough current to energize the magnets T and T' when the car first starts or in case the current stops at any time. In place of this mechanical means may be provided, if desired, for lifting the arm P until the contact-strips engage with the plate M.

Fig. 5 shows a modified form of the magnet T or T'. Here there is no air-gap between the magnet-core and the plate M. The plate M is shown as made entirely of iron, and the projecting end of the core is furcated, as shown, whereby there are several projecting strips or tongues *t*, which are adapted to engage with the plate, but may bend out of the way of obstructions on the track. This construction makes the plate M in reality a pole-piece of the magnet-core and decreases the magnetic reluctance caused by an air-gap.

Having described my invention, I claim—

1. In an electric railway, a U-shaped bar, suspended from the under side of the car, and provided with a series of pivots which extend at right angles to the line of motion of the car, and a series of strips pivoted at their upper ends upon the said pivots, combined with separate bars suspended below the one upon which the strips are pivoted, and suitable stops placed between the strips for regulating the distance they shall move upon their pivots, substantially as shown.

2. In an electric railway, the beam E, the U-shaped bar G secured to its under side, and the strips F pivoted to the bar G, the pivots of the strips being made to extend at right angles to the line of motion of the car so that the forward movement of the car will incline the strips backward, combined with the bars K, and the stops *k'* for limiting the movement of the strips, substantially as described.

3. In an electric railway, a bar suspended from the under side of the truck and through which the electric current is made to pass, a series of loosely-pivoted strips pivoted at their upper ends upon the bar and which are free to swing back and forth thereon, and means located below the pivots for limiting the amount of movement which the strips shall have, combined with boxes arranged along the track and with which the strips make connection as they pass over them, substantially as set forth.

4. In an electric railway, in combination, a motor-car and beam E carried thereby on its under side, a channel-shaped bar G secured on the under side of said beam E, a series of contact-strips carried by pins extending across said channel-bar, said strips

hanging between other cross-pins suitably supported lower down than their pivots, substantially as described.

5. In an electric railway, stationary contact-boxes arranged along the track and having smooth upper surfaces, combined with a brush formed from a number of loosely-swinging plates pivoted at their upper ends and which extend at right angles to the forward movement of the car and which form frictional contact with the tops of the boxes, and which plates move laterally over the tops of the boxes when the cars are swung around a curve, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK D. SWEET.

Witnesses:

IRVING H. GRISWOLD,

HELENA FOSKETT.