

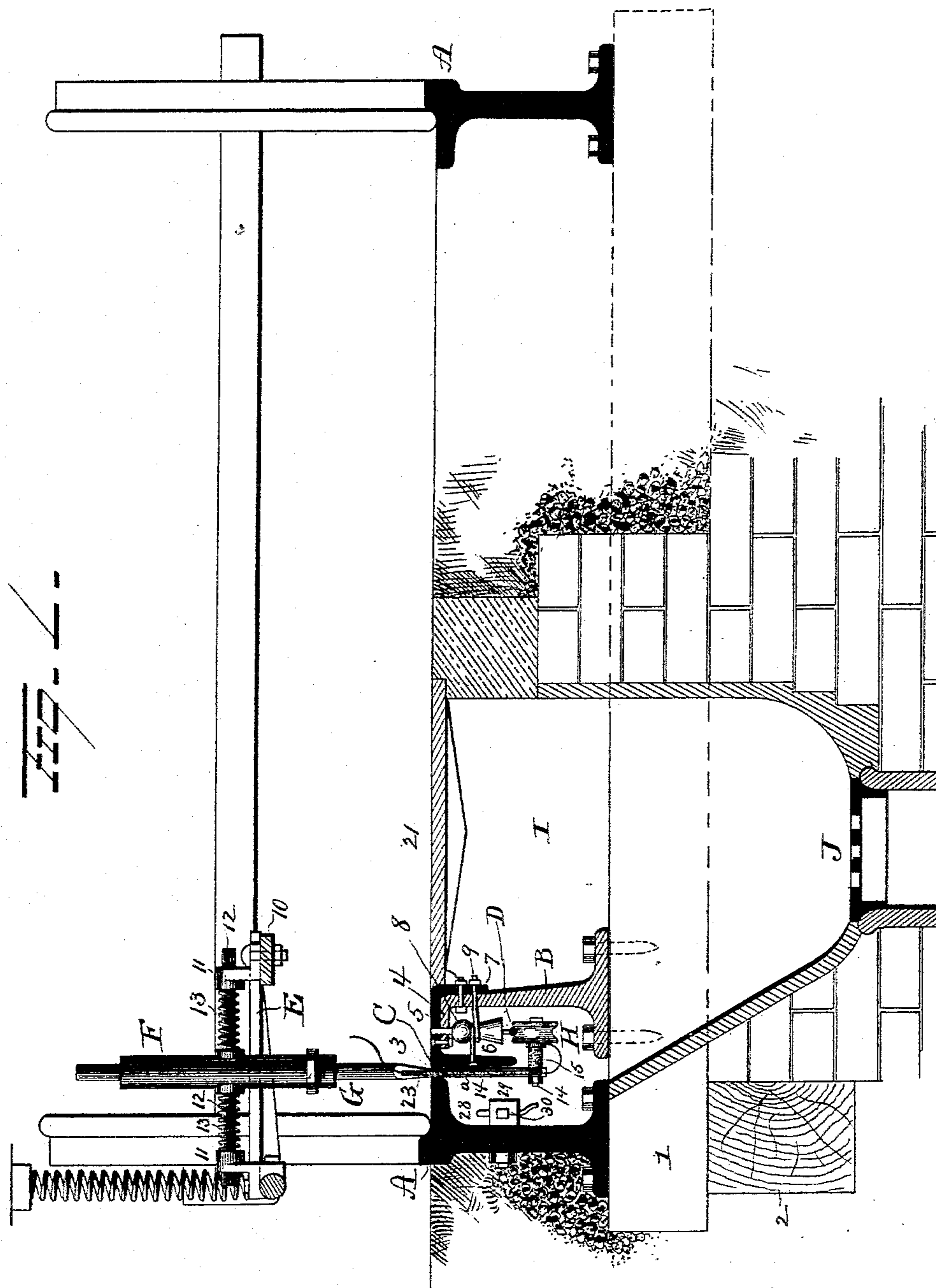
(No Model.)

2 Sheets—Sheet 1.

J. G. DOUTY.
ELECTRIC RAILWAY.

No. 533,447.

Patented Feb. 5, 1895.



Witnesses
G. F. Downing
S. W. Foster.

Inventor
J. G. Douty
By H. A. Seymour
Attorney

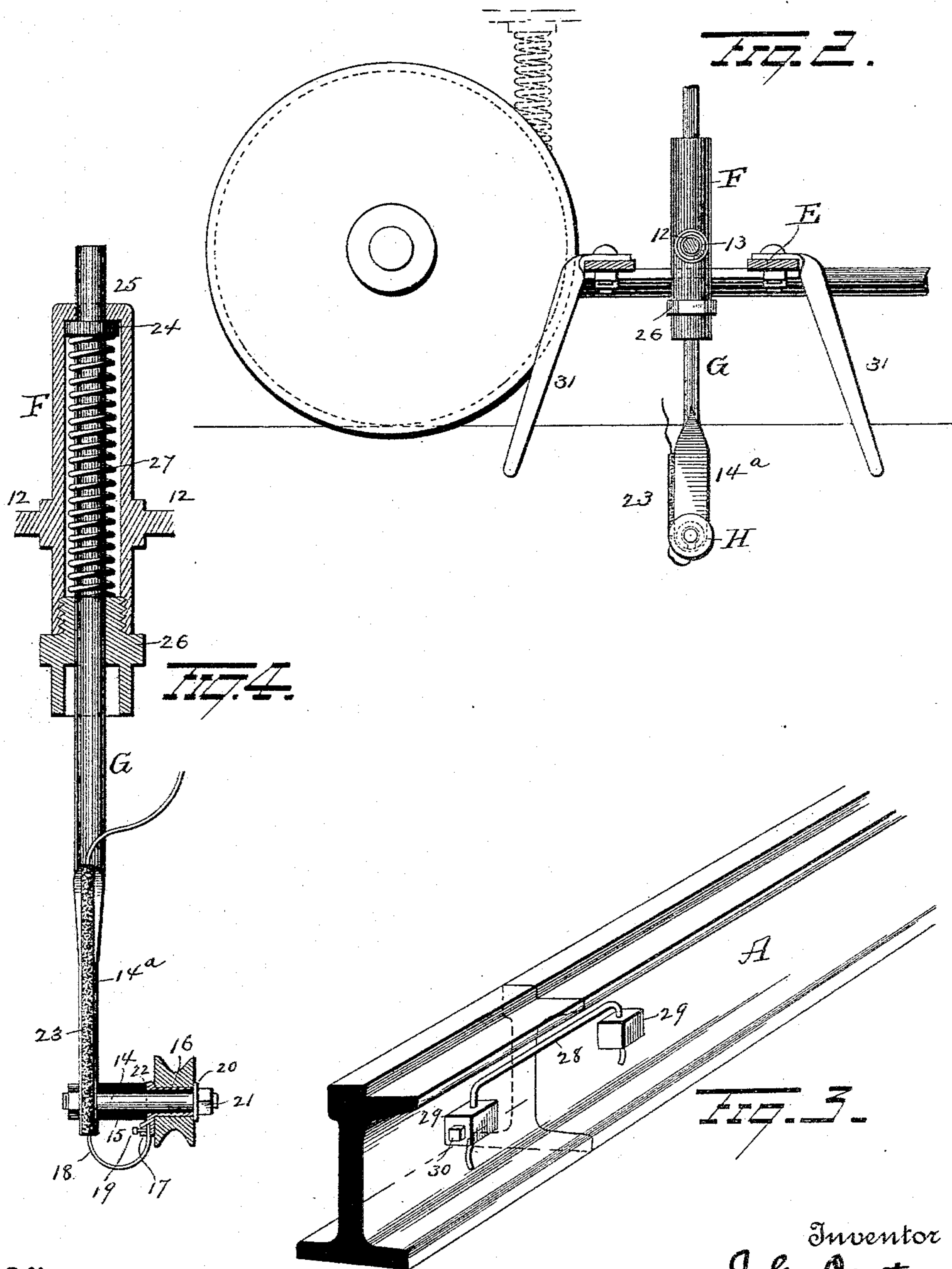
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UNITED STATES PATENT OFFICE.

JOHN G. DOUTY, OF WILLIAMSPORT, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS TO JAMES N. KLINE AND WILLIAM G. ELLIOT, OF SAME PLACE.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 533,447, dated February 5, 1895.

Application filed May 17, 1894. Serial No. 511,553. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. DOUTY, of Williamsport, in the county of Lycoming and State of Pennsylvania, have invented certain
5 new and useful Improvements in Electric Railways; 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
10 make and use the same.

My invention relates to an improvement in underground electric railways, the object of the invention being to reduce expense of construction to a minimum; to facilitate repairs
15 and altogether to provide a substantial construction and one which, although underground, will be easily accessible for repairs and which shall be effectual in all respects in the performance of its functions.

20 With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts as hereinafter set forth and pointed out in the claims.

25 In the accompanying drawings, Figure 1 is a view in cross section through the road bed and a portion of a car traveling on the rails thereof. Fig. 2 is a detail view illustrating the trolley arm and slot cleaners. Fig. 3 is a
30 view in perspective of a portion of two rails showing how they are electrically connected together. Fig. 4 is a detached view showing the trolley arm and wheel and the tubular arm.

A, A, represent the rails of the track.
35 These rails are secured to cross ties 1, located below the surface far enough so that the treads of the rails will be about flush with the surface of the road bed. The cross ties 1 in turn are supported on longitudinal stringers 2 lo-
40 cated directly beneath the rails in the usual manner, and these ties and stringers are embedded in the earth, in masonry, hydraulic cement or other suitable sub-structure adequate for the purpose of effecting a solid and
45 substantial foundation. The rails themselves may of course be of any pattern and preferably the tread is of considerable width as shown for the reason that the inner edge of this tread is utilized as one of the slot irons, the
50 slot through which the trolley arm passes, not being located midway between rails as is cus-

tomary, but next to the rails at one side of the track for various reasons. The reasons are these: One slot iron may be dispensed with altogether as the rails at one side of the
55 road bed serve the double purpose of rail and slot iron, thus reducing expense of construction greatly. Again it facilitates in the turning of curves as it brings the trolley arm near the wheels on one side of the car. 60

Chairs B are secured at intervals, to the cross ties 1 and in proximity to the rail A at one side of the road bed, the space between forming the slot 3 for the trolley arm. The chairs B are furnished at the top with an out-
65 wardly projecting, horizontal flange 4 which forms seats or supports for the guard rail or slot iron C. The latter consists preferably of a horizontal cap 5 secured to flanges 4 of the chairs and a pair of depending flanges 6 and
70 7 which fit around and incase the upper ends of the chairs, the inner one 6, extending downward far enough to form a guard for the trolley wire or conductor D, which latter is car-
75 ried in the space between this flange 6 and the chair, and the other flange 7 bolted or otherwise secured to the chair, so that if occasion requires it, this slot iron may be readily removed or repaired.

The trolley wire D is supported by suitable
80 insulators 8, from the flanges 4 of the chairs B and it may be braced laterally by rods or wires 9, extending from the insulators in either direction to the flanges 6 and 7.

To the truck of the car a frame or bracket
85 E is secured at any desired point between the car wheels, and projects a short distance inwardly. To the truck and the cross bar 10 of the frame or bracket E, journal boxes 11 are secured and adapted to receive two arms
90 or trunnions 12 projecting laterally from a tubular arm or socket piece F. Springs 13 are located on the arms or trunnions 12 and bear at their respective ends against the jour-
95 nal boxes 11 and the tubular arm or socket piece F, whereby to permit a yielding lateral movement of the latter.

A trolley arm G passes loosely through the tubular arm or socket piece F and is adapted to turn freely therein, the upper end of said
100 trolley arm being adapted to project within the car, where it is connected with any suit-

able devices for manually moving it vertically to remove trolley wheel H, carried by the lower end of the arm G, out of contact with the conductor or trolley wire D. A spindle 14 is secured to and projects laterally from the lower end of the flattened portion 14^a of the trolley arm G, for the accommodation of the trolley wheel H. On this spindle a sleeve 15 of hard rubber is secured and extends from end to end thereof. The outer end of the sleeve 15 is somewhat contracted in size and on this contracted portion a collar 16, preferably of brass, is secured and on the brass collar the trolley wheel is revolvably mounted. An arm 17 projects from the brass collar 16, parallel with one face of the trolley wheel and is made with a socket for the reception of a conductor 18, held therein by means of a suitable set screw 19. From its connection with the brass collar 16, the conductor 18 will be passed through a pipe 23, preferably of lead, secured in a groove in the edge of the lower portion of the trolley arm and thence to the motor on the car. An insulated disk 20 is placed on the end of the spindle 14 and bears against the trolley wheel, being retained in position by means of a suitable nut 21. Lateral movement of the trolley wheel toward the trolley arm will be prevented by the sleeve 15, the shoulder 22 of which bears against the brass collar 16.

The trolley arm G is provided with a fixed collar 24 adapted to bear normally against the shoulder 25 at the upper end of the tubular arm or socket piece F, the lower end of which latter is internally screw threaded for the reception of a hollow nut 26, through which said trolley arm passes. On the trolley arm, between the collar 24 and the hollow nut 26, a spring 27 is located and adapted to maintain the wheel H carried by the trolley arm, always in proper line with the conductor or trolley wire D, but at the same time permitting the depression of the trolley arm and wheel when it is desired to move the latter away from the conductor by means of the usual manually operated devices on the car.

From the construction and arrangement of parts above described, it will be seen that the trolley carrying devices are permitted to have an oscillatory motion and yielding lateral motion and that the trolley arm G is permitted to turn in the tubular arm F, thus allowing the car to which the devices are attached to run on curves without causing the trolley arm to bind in the slot.

The rails A constitute one of the conductors for the current, the joints being connected together by a bond wire 28, said wire being held in the holes in the heads of bolts 29, by set screws 30.

Arms 31 are secured to the frame or bracket E in front and rear of the trolley arm and project through the slot 3 for cleaning out the ice, dirt or other substance accumulating therein.

Man holes I are located at intervals of the

road bed and adapted to receive water, &c., which may pass through the slot 3. These man holes may be connected with a sewer, as at J, for drainage purposes. Over each man-hole a removable lid 21 is placed.

It is evident that slight changes might be made in the details of construction of my invention without departing from the spirit thereof or limiting its scope and hence I do not wish to limit myself to the precise details of construction herein set forth; but,

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a rail, a chair, and a slot iron comprising a horizontal portion and two flanges depending from the edges thereof, said slot iron secured to the chair, of a trolley wire supported in the space between the flanges of the slot iron and devices connecting the insulator with the slot iron at three points, substantially as set forth.

2. In an electric railway, the combination with a car and a trolley wire, of a tubular arm pivotally connected to the car, a trolley arm passing through said tubular arm in such manner as to be capable of movement axially and longitudinally therein, and a trolley wheel carried by said trolley arm, substantially as set forth.

3. In an electric railway the combination with a car and a trolley wire, of a tubular arm pivotally connected to the car in such manner as to have a yielding lateral motion, a trolley arm passing through the tubular arm so as to turn axially therein, means for permitting the yielding longitudinal movement of said trolley arm and a trolley wheel carried by said trolley arm, substantially as set forth.

4. In an electric railway, the combination with a car and a trolley wire, of a tubular arm pivotally connected to the car, springs for permitting said tubular arm to have a lateral yielding movement, a trolley arm passing through the tubular arm, and adapted to turn therein, and a trolley wheel carried by said trolley arm, substantially as set forth.

5. In an electric railroad, the combination with a car and a trolley wire, of a tubular arm connected to the car, a vertically movable trolley arm passing through the tubular arm, a trolley wheel carried by the trolley arm, a collar on the trolley arm adapted to engage a shoulder on the tubular arm to limit the movement of the trolley arm in one direction and a spring in the tubular arm, said spring bearing at one end against the latter and at the other end against said collar, whereby to maintain the trolley arm at one end of its vertical movement and the wheel in line with the trolley wire, substantially as set forth.

6. In an electric railroad, the combination with a car and a trolley wire, of a tubular arm connected to the car, a trolley arm passing through the tubular arm and yieldingly supported therein, a spindle projecting laterally

from the end of the trolley arm, a trolley wheel on said spindle and insulated therefrom, a metal collar between said insulation and the wheel, and a conductor connected to
5 said collar and adapted to be connected in circuit with the motor on the car, substantially as set forth.

7. In an electric railroad, the combination with a car and a trolley wire, of a frame secured to the car, a tubular arm having trunnions mounted on said frame, springs between said tubular arm and the bearings of its trunnions, a trolley arm carried by the tubular arm, and a trolley wheel carried by
15 the trolley arm, substantially as set forth.

8. In an underground electric railroad, the

combination with a car and a trolley wire located in a conduit, of a frame carried by the car, a tubular arm mounted on said frame, a trolley arm carried by the tubular arm and
20 passing through the conduit slot, a trolley wheel carried by the trolley arm and arms secured to said frame and passing through the slot for cleaning the same, substantially as set forth.

25 In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOHN G. DOUTY.

Witnesses:

T. S. LAND,

KATRINA FRENDEBERGER.