

C. M. BRIDGES.  
CONDUIT ELECTRIC RAILWAY.

No. 555,208.

Patented Feb. 25, 1896.

Fig. 1.

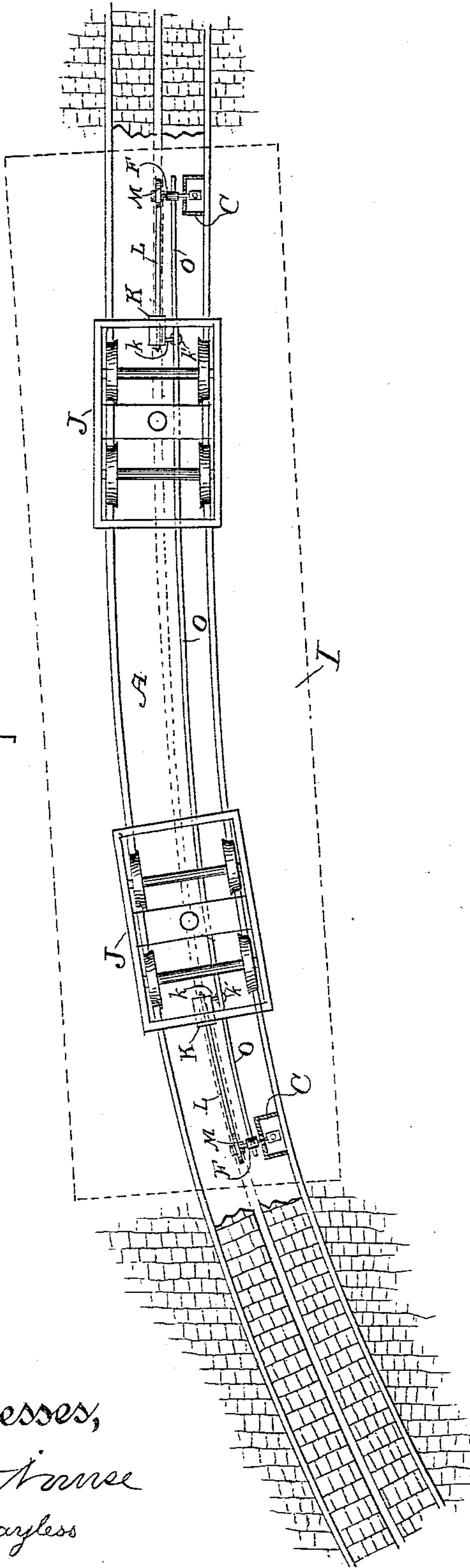
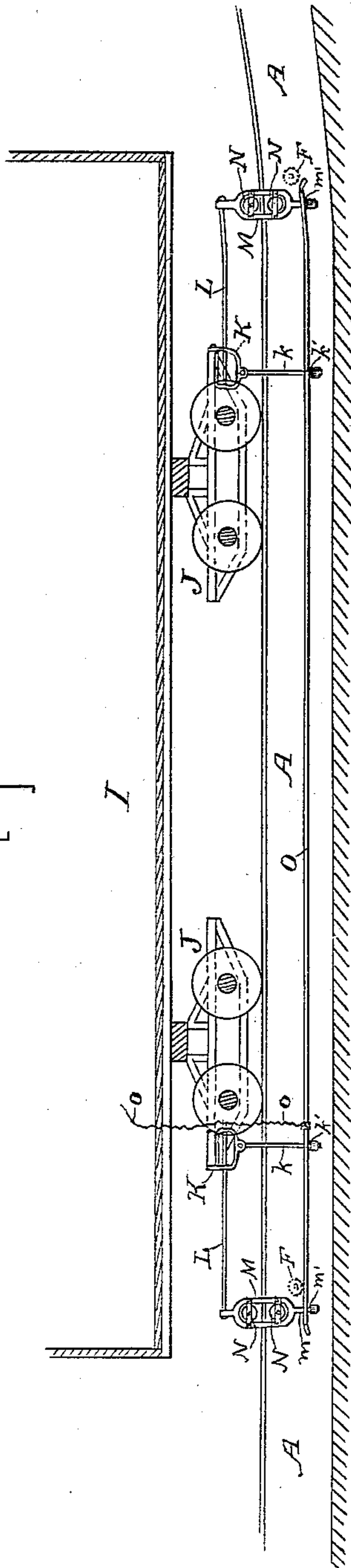


Fig. 2.



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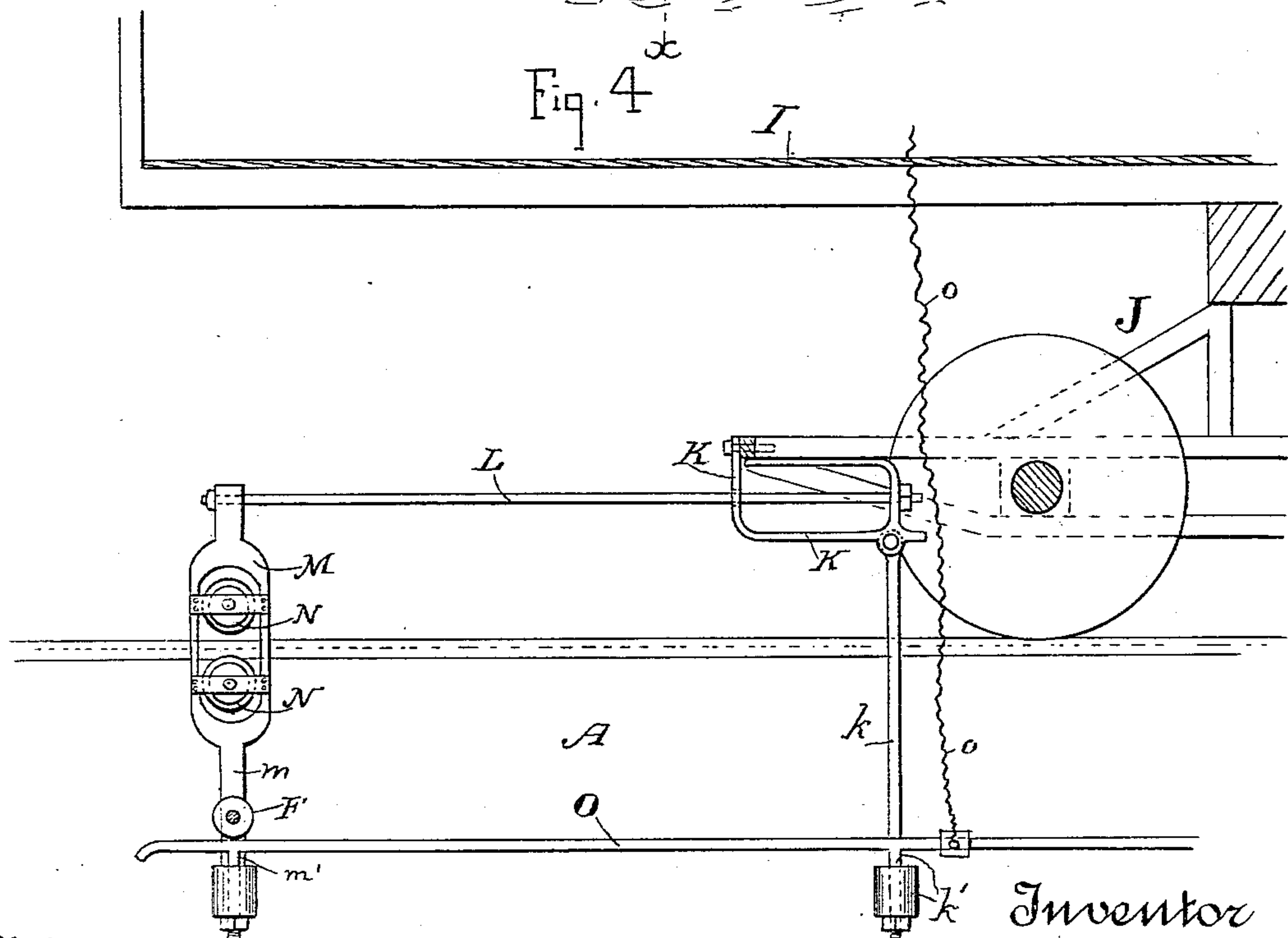
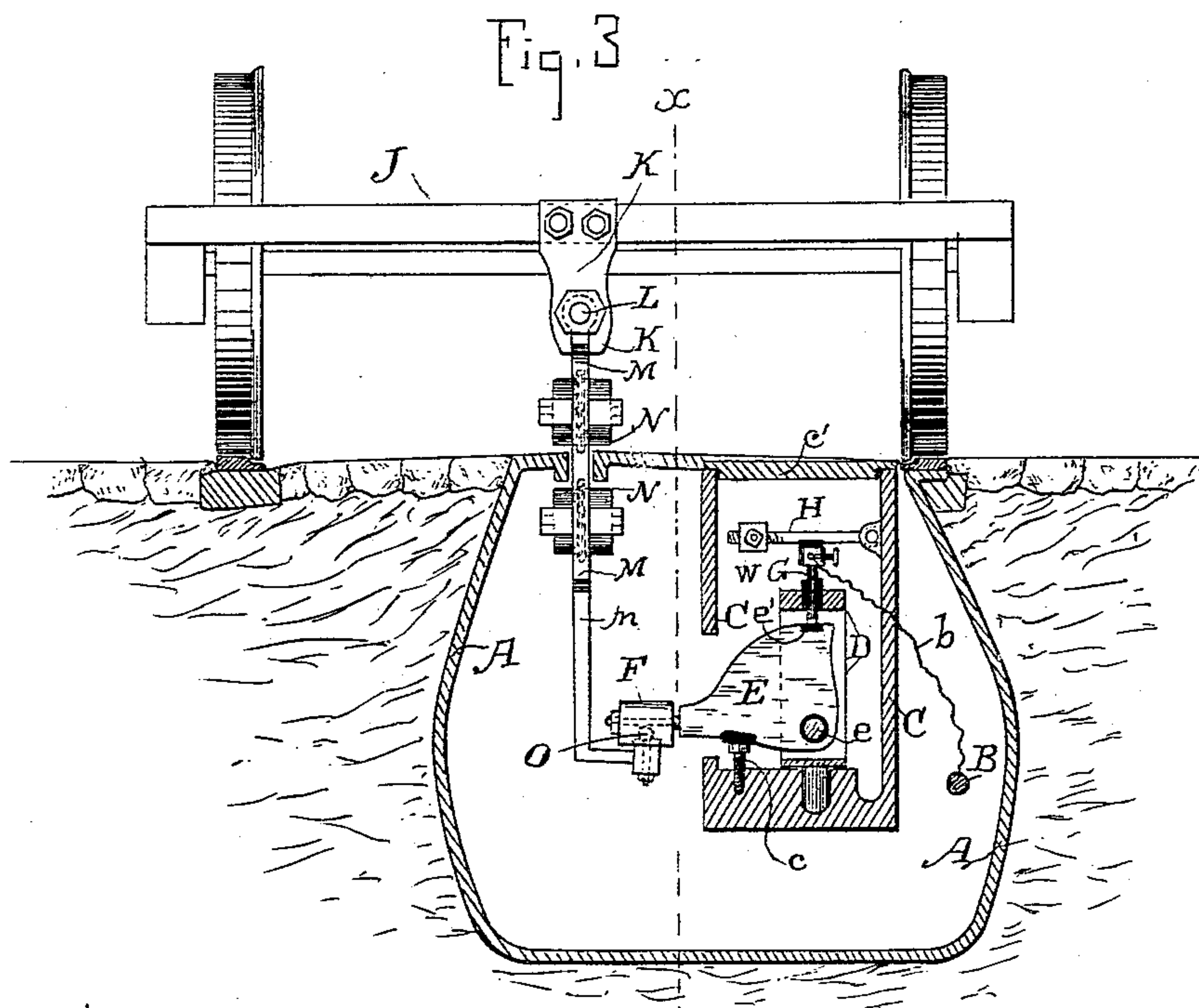
(No Model.)

2 Sheets—Sheet 2.

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Inventor  
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# UNITED STATES PATENT OFFICE.

CHRISTOPHER M. BRIDGES, OF SEATTLE, WASHINGTON, ASSIGNOR OF ONE-FIFTH TO JOHN S. FANNING, OF SAN FRANCISCO, CALIFORNIA.

## CONDUIT ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 555,208, dated February 25, 1896.

Application filed May 31, 1895. Serial No. 551,292. (No model.)

*To all whom it may concern:*

Be it known that I, CHRISTOPHER M. BRIDGES, a citizen of the United States, residing at Seattle, King county, State of Washington, have invented an Improvement in Conduit Electric Railways; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of conduit electric railways; and it consists in the novel construction and arrangement of the several parts thereof, which I shall hereinafter fully describe by reference to the accompanying drawings, in which—

Figure 1 is a plan of the road-bed with a portion broken away to show the interior of the conduit. Fig. 2 is a vertical longitudinal section of car and conduit. Fig. 3 is a cross-section. Fig. 4 is a detail longitudinal section.

A is a slotted conduit of any suitable form, and having within it a supply electrical conductor B, which is supported, protected and insulated in approved forms. At intervals in the conduit are boxes C, secured and supported in suitable manner. In each box is a standard D, in which is pivoted at *e* an arm E, the end of which projects through an opening in box C and forms a journal upon which is mounted a contact-roller F, the periphery of which may have a suitable form. The arm and roller return to and remain in a normal position by gravity, and in this position, which is a horizontal one for the roller, they are limited by a stop-screw *c* in the bottom of the box.

In the top of standard D is mounted a slide-pin G, insulated from the standard and having electrical connection through the wire *b* with the supply-conductor B. This pin bears down upon the arm E, and the normal point of contact is with an insulated section or piece *e'* in said arm. This contact is rendered positive and insured by means of a lever H pivoted to the box C and bearing upon the top of the slide-pin through an insulated piece. The lever has an adjustable weight W to regulate its pressure.

I is a car having the trucks J. To each truck is secured a bracket K, in which is fitted a rod L, which extends over the road-bed and is made to conform to the directions thereof by a suitable adjustable mounting,

or, as is preferable, by being made flexible. To the extremity of the rod L is connected a hanger M, which passes down through the slot of the conduit, and has mounted in it the centrally-flanged guide-rollers N, one above and the other below the slot-irons, and adapted each to have its flange enter the slot, as occasion may require, and to have its side portions run on or against the slot-irons either above or below, as the case may be. From this hanger depends an arm *m*, which serves as one of the supports or carriers for the contact-bar O, said bar being also supported by the lower extremity of another arm *k* depending from the bracket K. The supporting extremities of these arms are fitted with oscillating pins *m'* and *k'*, to which bar O is secured so that it may conform to the curvature of the track, as I shall explain, and said bar O is long enough to overlap two of the contact-rollers F, so that while traveling for the most part under but one roller it will come in contact with the second before leaving the first.

In the operation of the road the bar O travels under and in contact with the rollers F, and its position vertically is such that it lifts said rollers above their normal planes. This swings the arms E and thereby throws the insulated sections or pieces *e'* of said arms from under the contact-pins G, so that said pins then make electrical connection with the arms and the current flows from the supply-conductor through wires *b*, pins G, arms E, and rollers F to bar O, from which an electric wire *o* extends to the motor. The supply-conductor is by these means permanently insulated and may, therefore, be effectually protected. The connections are normally out of circuit and are only called into action when the car is passing. The bar O must conform to the several bends and curvatures of the track. To do this the preferable and best way is to make said bar flexible, so that by means of the hanger M it will conform to all directions and follow the rollers F through all curves. The arm *k* is hinged at its upper end, and this, in connection with the oscillating pins *m'* and *k'*, on which the bar O is mounted, enables the latter to conform to direction as required.



The object of guide-rollers N is to provide for maintaining the plane of the contact-bar O constant at changes of grade.

The boxes C, in their best position, depend 5 from the roof of the conduit, and each is provided with a removable waterproof cover c', whereby access may readily be had to the interior parts for renewal and repairs. These boxes are to be suitably insulated, and the 10 standards D therein are mounted on insulating material. By having all the interior parts suspended from above, the bottom of the conduit is left clear for scraping or cleaning.

Having thus described my invention, what 15 I claim as new, and desire to secure by Letters Patent, is—

1. In a conduit electric railway, the combination of a series of rollers in the conduit, swinging arms on which said rollers are 20 mounted, insulated sections or pieces carried by said arms, contact-pins slidably mounted and positively and normally bearing on said insulated sections or pieces, and an electrical connection from said pins to a supply-conductor, and a contact-bar carried by the car 25 and having electrical connection with the motor thereof, said bar being adapted to travel in contact with said rollers and by said contact to swing the arms successively, to throw 30 the contact-pins from the insulated sections of the arms into electrical connection with said arms, whereby the circuit to the motor is established.

2. In a conduit electric railway, the combination of a series of accessible boxes in the 35 conduit, arms pivoted therein, each having an insulated section or piece, contact-pins slidably mounted in the boxes and means engaging the pins and causing them to normally 40 bear on said insulated section or piece and each of said pins having an electrical connection with a supply-conductor, a roller carried by each swinging arm, and a contact-bar carried by the car and having electrical con- 45 nection with the motor thereof, said bar being adapted to travel in contact with said rollers and by said contact to swing the arms successively, to throw the contact-pins into electrical connection with them, whereby the 50 circuit to the motor is established.

3. In a conduit electric railway, the combi-

nation of a series of accessible boxes in the conduit, arms pivoted therein, each having an insulated section or piece, contact-pins 55 vertically slidable in the top of the boxes and normally bearing on said insulated section or piece and each having an electrical connection with a supply-conductor, a weighted arm bearing upon the top of the pin for control- 60 ling each contact-pin, a roller carried by each swinging arm, and a contact-bar carried by the car and having electrical connection with the motor thereof, said bar being adapted to travel in contact with said rollers and by said contact to swing the arms successively, to 65 throw the contact-pins into electrical connection with them, whereby the circuit to the motor is established.

4. In a conduit electric railway, and in combination with a series of rollers in the conduit, 70 normally out of electrical connection with a supply-conductor, a contact-bar carried by the car and adapted by contact with said rollers to throw them successively into electrical connection with the conductor, and a 75 hanger from the car, passing through the slot of the conduit and secured to the flexible bar, said hanger having the extremities of its arms fitted with oscillating pins to which the contact-bar is secured whereby it effects the 80 bending of said bar to conform to the direction of travel.

5. In a conduit electric railway, and in combination with a series of rollers in the conduit, 85 normally out of electrical connection with a supply-conductor, a flexible bar adapted by contact with said rollers to throw them successively into electrical connection with the conductor, and means for supporting said bar from the car, consisting of a flexible rod under 90 the car, a hanger depending from said rod and traveling in the slot of the conduit, said hanger having guide-rollers acting on the slot-walls, and suitable depending arms provided with oscillating pins for flexibly 95 mounting the contact-bar.

In witness whereof I have hereunto set my hand.

CHRISTOPHER M. BRIDGES.

Witnesses:

S. H. NOURSE,

JESSIE C. BRODIE.