(No Model.) 2 Sheets—Sheet 1.

M. A. MICHALES.

ROAD FOR RAPID TRANSIT.

No. 403,687. Patented May 21 1889.

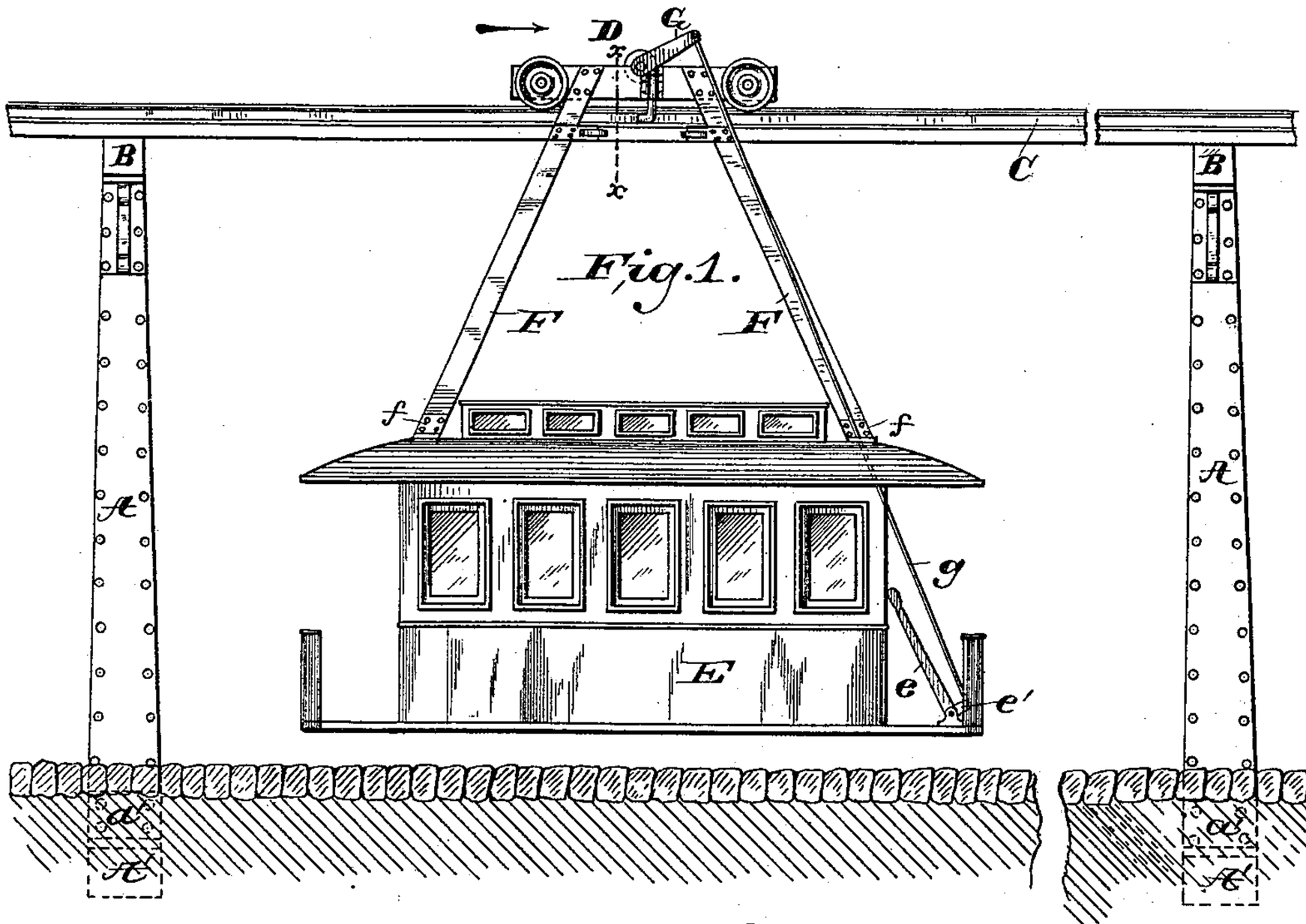

Fig. 1.

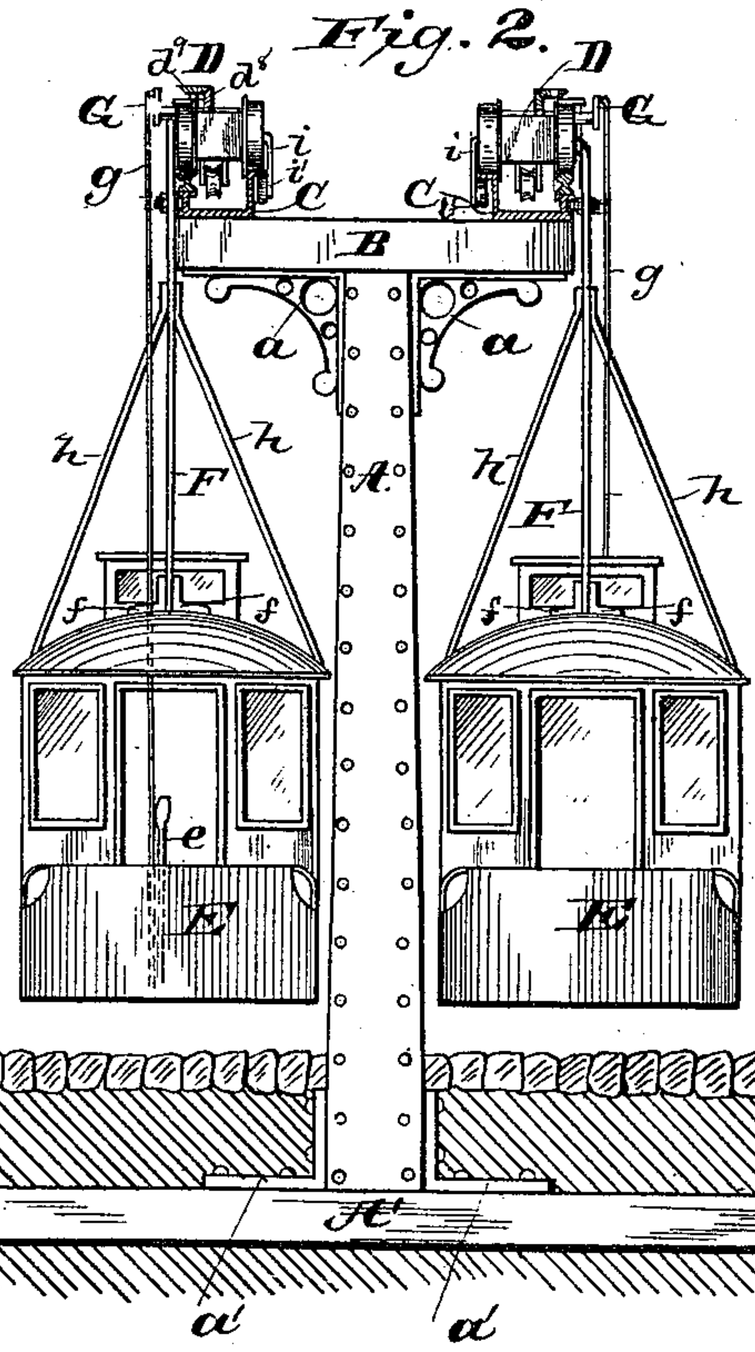

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

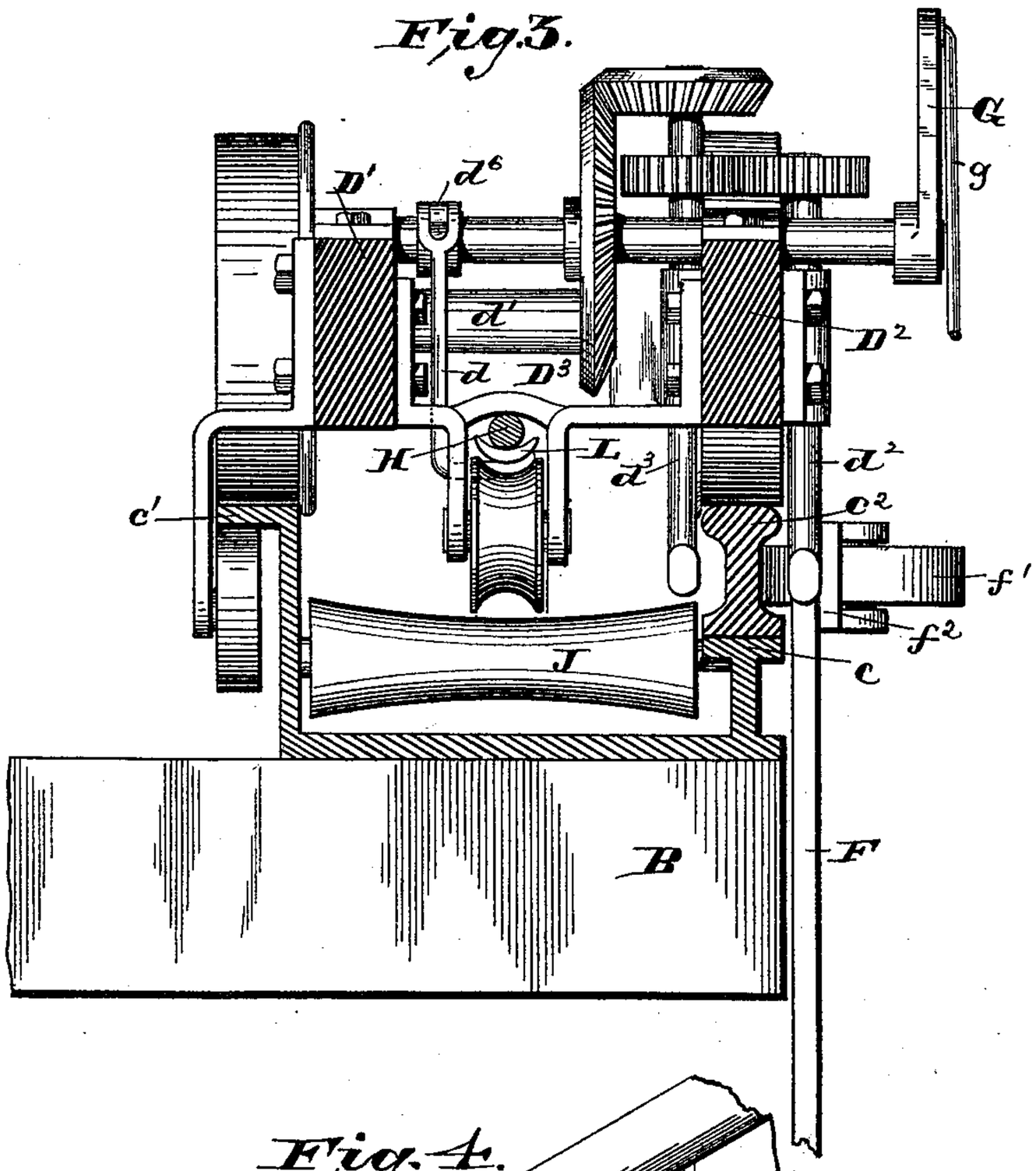
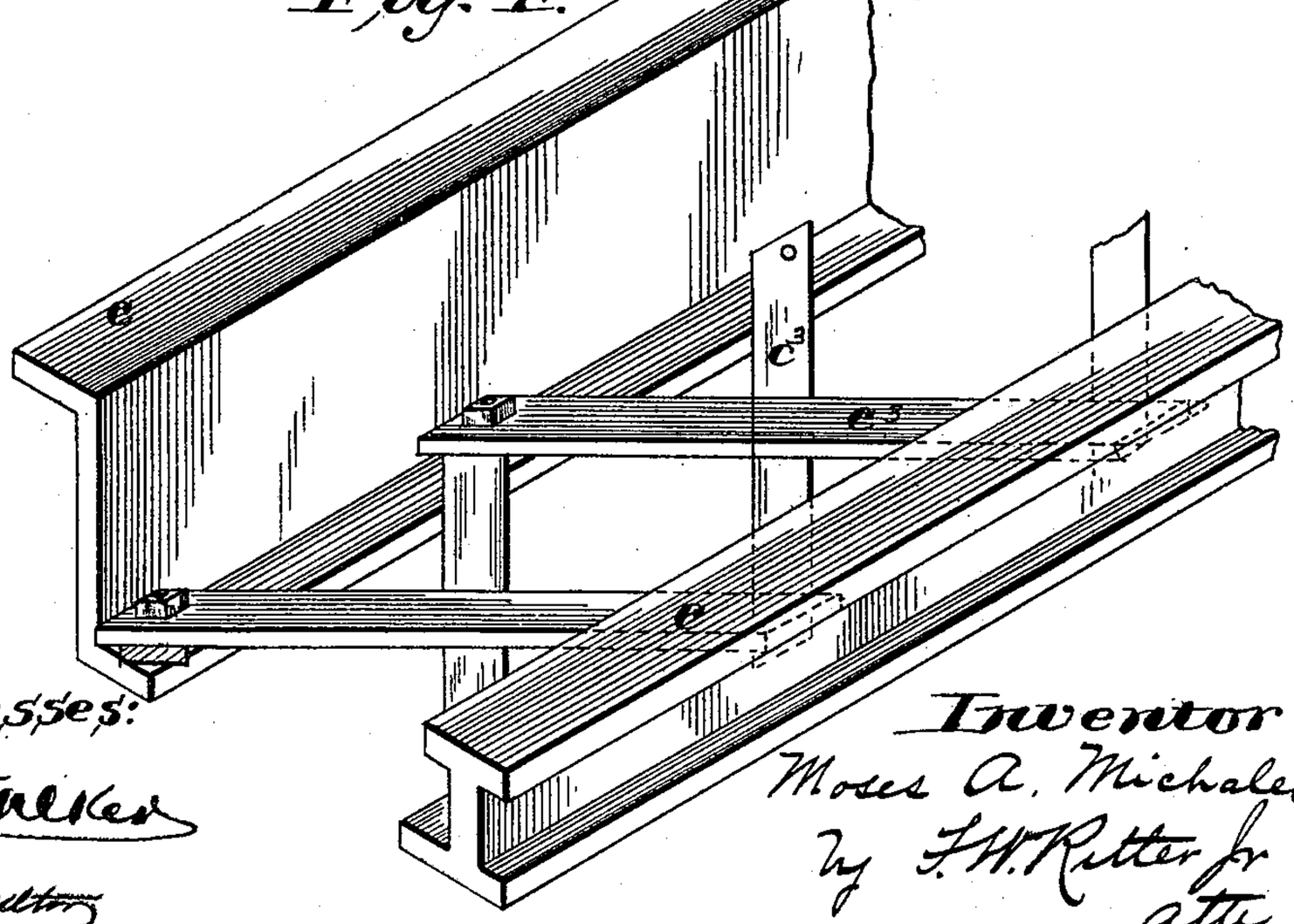


Fig. 4.



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UNITED STATES PATENT OFFICE.

MOSES A. MICHALES, OF ALLEGHENY, ASSIGNOR OF ONE-HALF TO JOHN T. MOORE, OF PITTSBURG, PENNSYLVANIA.

ROAD FOR RAPID TRANSIT.

SPECIFICATION forming part of Letters Patent No. 403,687, dated May 21, 1889.

Application filed May 15, 1888. Serial No. 273,951. (No model.)

To all whom it may concern:

Be it known that I, MOSES A. MICHALES, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Roads for Rapid Transit; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, wherein—

Figure 1 represents a side elevation of a section of my improved cable railway, showing a car suspended therefrom. Fig. 2 is a transverse section of the track, showing the column and cross-beam together with two cars in elevation. Fig. 3 is a vertical cross-section of the same on the line *x x* of Fig. 1, looking in the direction of the arrow. Fig. 4 is a detached perspective of a portion of the U-track, showing how the same may be constructed from angle-iron in a light and strong manner.

Like letters of reference refer to like parts wherever they occur.

My present invention relates to means for operating street-railroads where rapid transit is desirable, and pertains more especially to overhead or elevated-track roads where a cable-motor is employed, though any other desired form of motor may be used.

The main features consist in double-rail U-shaped horizontal-flanged track-irons and in trucks having peculiarly-arranged brace-wheels and side-suspended cars, whereby lateral vibration of the car or derailment of the truck is prevented, substantially as will hereinafter more fully appear.

I will now proceed to describe my construction more specifically, so that others skilled in the art to which it appertains may apply the invention.

In the drawings, A represents posts or columns located at suitable intervals, B the transverse cross-beams for the support of the bed of the track, and C the tracks, one of which is carried at each end of said cross-beams and extends from one cross-beam to the other throughout the entire line. If found desirable, the tracks may be supported upon longitudinal bed-beams between the transverse cross-beams B.

D is a truck adapted to travel on the tracks C, from which depend stout metallic frames F, from the lower ends of which a car, E, is suspended at such distance above the ground or pavement as to afford easy access thereto. The lower end of the column A is supported upon a heavy foundation-sill, A′, buried at some distance beneath the surface of the pavement or roadway, and is secured thereto by heavy angle-plates *a′*, as shown in Figs. 1 and 2. The cross-beam B is secured centrally to the column, the ends being supported therefrom by struts or brackets *a*, as shown. To the upper sides of the cross-beams B, at the outer ends, are secured the tracks C, consisting of lengths of heavy U-shaped angle-iron C′, the verticals of which constitute the tracks or treads for the wheels of the truck. The preferred construction is substantially that shown in the drawings—that is to say, the outer leg of the U-shaped angle-iron terminates below the top of the inner leg in a T-head, *c*, while the inner leg terminates in an outturned flange, *c′*. Upon the T-head of the outer leg of this angle-iron is secured the foot of an ordinary railway-rail, c^2, completing the U, the head thereof lying in a horizontal plane with the flange *c′* of the inner vertical.

By the foregoing preferred forms of construction I am enabled to form one of the journal-bearings of the cable-roll J by perforating the inner vertical flange of the U-shaped angle-iron, while the other or outer journal-bearing of the roll may be formed in the T-head *c* of the outer vertical, and the rail c^2 will form the cap of the journal, the advantage of which will be apparent to the skilled mechanic. It is evident, however, that other means may be provided for journaling the cable-rolls, and that the arms or verticals of the U-shaped angle-iron may be continuous or formed in a single piece and of equal height. In Fig. 4 I have shown a portion of the track in perspective and the detail of a construction which will be found to be both light and strong, as well as cheap—that is to say, the inner vertical is a flanged angle-iron, and the outer vertical an I-beam, the two connected rigidly by transverse bars c^3, forming the bottom of the U, whereby the same result—to wit, a U-track—is obtained as effect-

ively as if the verticals and base-plates were formed continuously, as shown in section in Fig. 3. Within the trough of the U-track are arranged the cable-rolls J, and where corners are turned the usual vertical rollers are also employed, said features being well known in present constructions.

The truck D consists of a stout iron framework comprising inner and outer side sills, D′ D^2, and end sills, D^3. The truck may be constructed so as to bring one of the sills over the rail c^2, as shown in Fig. 3, to provide a support for the rail-brake in line with and directly over said rail. This is the preferred construction, though it will be evident to the skilled mechanic that the same result can be produced in a number of well-known ways—for instance, a bracket bolted to the side of the rail D^2. The wheel-axles d' are journaled in bearings secured within or forming part of the side sills of the truck-frame near the ends. On the upper faces of the side sills of the truck are secured journal-boxes, in which is mounted a transverse shaft, d^5, provided with a crank-arm, d^6, to the end of which is pivoted the upper end of a rod, d, which operates a cable-grip of any approved construction.

The rail-brake adapted to illustrate the operation of my invention consists of two vertical shafts d^2 and d^3, having brake-shoes at their lower ends to grasp the rail and operated from the transverse shaft d^5 by any suitable intermediate mechanism.

The shaft d^5 extends beyond the outer sill, D^2, of the truck-frame, and is provided at its outer end with a crank-arm, G, which is secured to one end of a connecting-rod, g, the other end of which is secured to the short arm e' of an L-shaped operating-lever, e, fulcrumed in bearings on the platform of the car E, by which mechanism, it will be observed, the conductor has control of both cable-grip and brake through the medium of a single lever, which has its advantages. It is evident, however, that by multiplying the shafts and gearing of the mechanism before described any skilled mechanic can destroy the unity of operation and substitute a lever for each—viz: one for the brake and one for the grip.

The stout arms F are bolted at their upper ends to the outer side of the side sill, D^2, of the truck-frame, and at their lower ends are bolted to angle-irons f, secured to the top of the car E. In order that the car may be more rigidly secured to the arms F, I provide the same with brace-rods h h, bolted at their lower ends to the top of the car on opposite sides thereof and at their upper ends to the arms F, as shown in Fig. 2. In order to counteract lateral vibration of the car, I provide each of the arms F F with an anti-friction roller, f', journaled in a yoke or plate, f^2, bolted to the arms F and adapted to run in the groove in the outer vertical of the U-shaped angle-iron C′, and thereby hold the arms F a fixed distance from the tracks and ends of the cross-beams B. In conjunction with the means just described for counteracting the lateral vibration of the car, I prefer to use a pendent arm, i, secured to the inner sill, D′, of the truck D, in which is journaled a wheel, i', which travels on the under face of the flange c' of the inner rail.

It will be evident that either of the last-described mechanisms may be independently employed; but their conjoined use will produce the best results, as by means of the latter devices any tendency of the lateral vibration to derail the truck will be effectually resisted.

Among the advantages of combining with an elevated track and a truck a rail-brake of the general character hereinbefore specified is the ability to preserve at all times contact between the rails and the truck, and similar results are also obtained by means of the traveler-roller which bears on the under side of the inside rail, and also by the rollers f', which travel along the side of the outer rail or vertical of the track; and as a consequence of each and all of said constructions it is practical to use an electric motor with an elevated track and to arrange for the momentary breaking of the circuit at crossings.

The operation of my improved cable railway is as follows: The endless cable H runs on guide-rolls J, journaled at intervals in the U-shaped angle-irons C′. When the car is at rest, the brake-shoes on the ends of the vertical shafts d^2 d^3 are in frictional contact with the rail c^2 and the cable is released. When it is desired to start the car, the hand-lever e is moved to the position shown in Fig. 1, which raises the crank-arm G on the shaft d^5, by means of the connecting-rod g, and practically rotates the shaft d^5, which rotation causes the crank-arm d^6 to rise and close the grip upon the cable and thereby start the car. At the same time that the grip closes upon the cable the rotation of the shaft d^5 imparts rotary motion to the vertical shafts d^2 and d^3 and releases the track-rail c^2 by turning the shoes d^{14} away from it laterally. The reverse of the before-specified step will apply the rail-brake and simultaneously release the cable-grip. In the respects not hereinbefore specified the operation is the same as in other cable railways.

I am aware that in surface-roads where the car-body is carried on the truck and the weight balanced thereon a rail-brake has been used in conjunction therewith, and I do not herein claim the same; but I am not aware that in an elevated road wherein the weight is suspended below and at one side of the truck that a rail-brake has been used in conjunction therewith, so as to counteract the lateral vibrations of the truck on the application of the brake; and therefore,

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

1. The combination, with a double-rail track

having horizontal flange on one rail and a truck therefor, of a car suspended below and from one side of the truck, an arm pendent from the opposite side of the truck, and provided with a wheel which travels on the under side of the said flange, substantially as and for the purposes set forth.

2. The combination, with a double-rail track having a horizontal flange on one rail and a truck therefor, of a car suspended below and from one side of the truck, a pendent arm provided with a wheel which travels on the under side of the rail-flange, and a lateral brace-wheel on the suspension-rod of the car which travels in the web of the opposite rail, substantially as and for the purposes set forth.

3. In an elevated railway, the U-shaped double-rail track, one of whose verticals is provided with a horizontal flange, as at *c'*, substantially as and for the purposes specified.

4. In an elevated railway, the U-shaped double rail having two verticals, one of which has a single horizontal flange and the other a T-head or double flange, substantially as and for the purposes specified.

5. In an elevated railway, the combination, with the U-shaped track-iron having two unequal flanged verticals, of a rail of the common form, substantially as and for the purposes specified.

6. In an elevated-railway track for cable railways, the combination, with the U-shaped track having verticals of unequal height, of cable-rollers, and a separable cap-rail arranged on the short vertical which forms the journal-bearing of the cable-rollers, substantially as and for the purposes specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 12th day of May, 1888.

MOSES A. MICHALES.

Witnesses:
E. T. WALKER,
F. W. RITTER.