

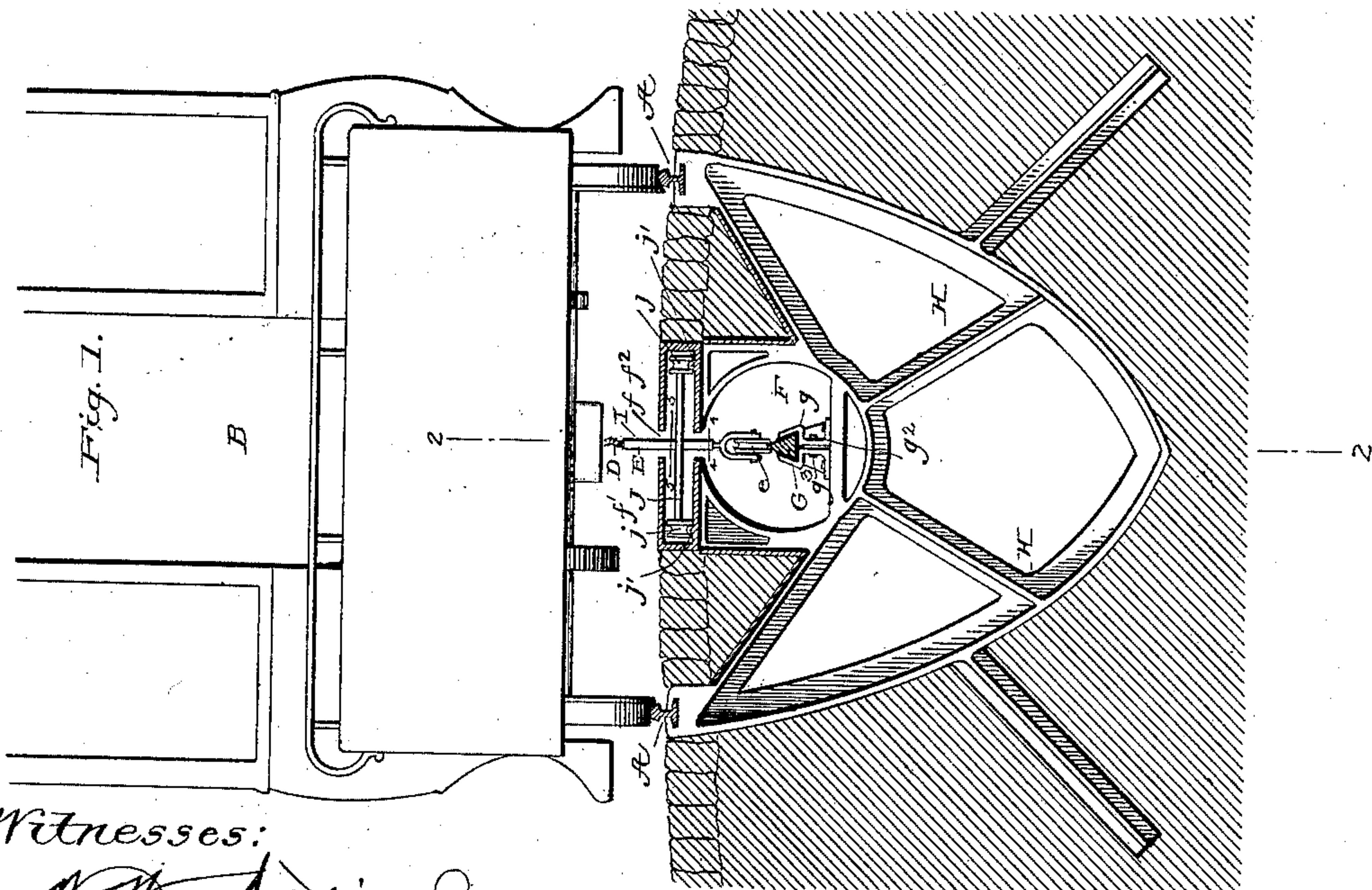
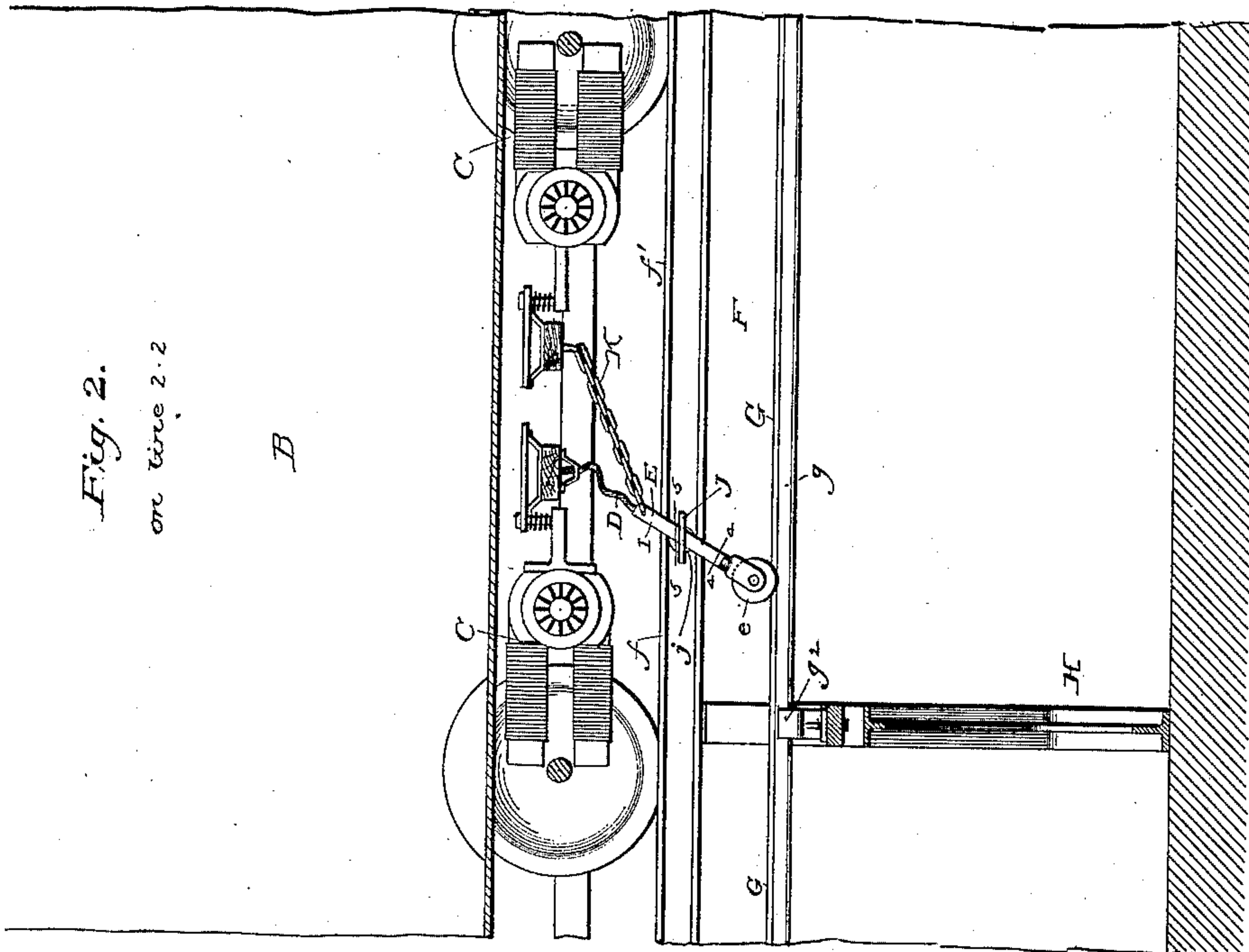
(No Model.)

2 Sheets—Sheet 1.

J. EMMNER, Jr.
ELECTRIC RAILWAY.

No. 465,844.

Patented Dec. 29, 1891.



Witnesses:

H. M. Mortimer
Levin Family Currier

Inventor:

Julius Emmner Jr.
By J. Y. Dodge - Atty.

(No Model.)

2 Sheets—Sheet 2.

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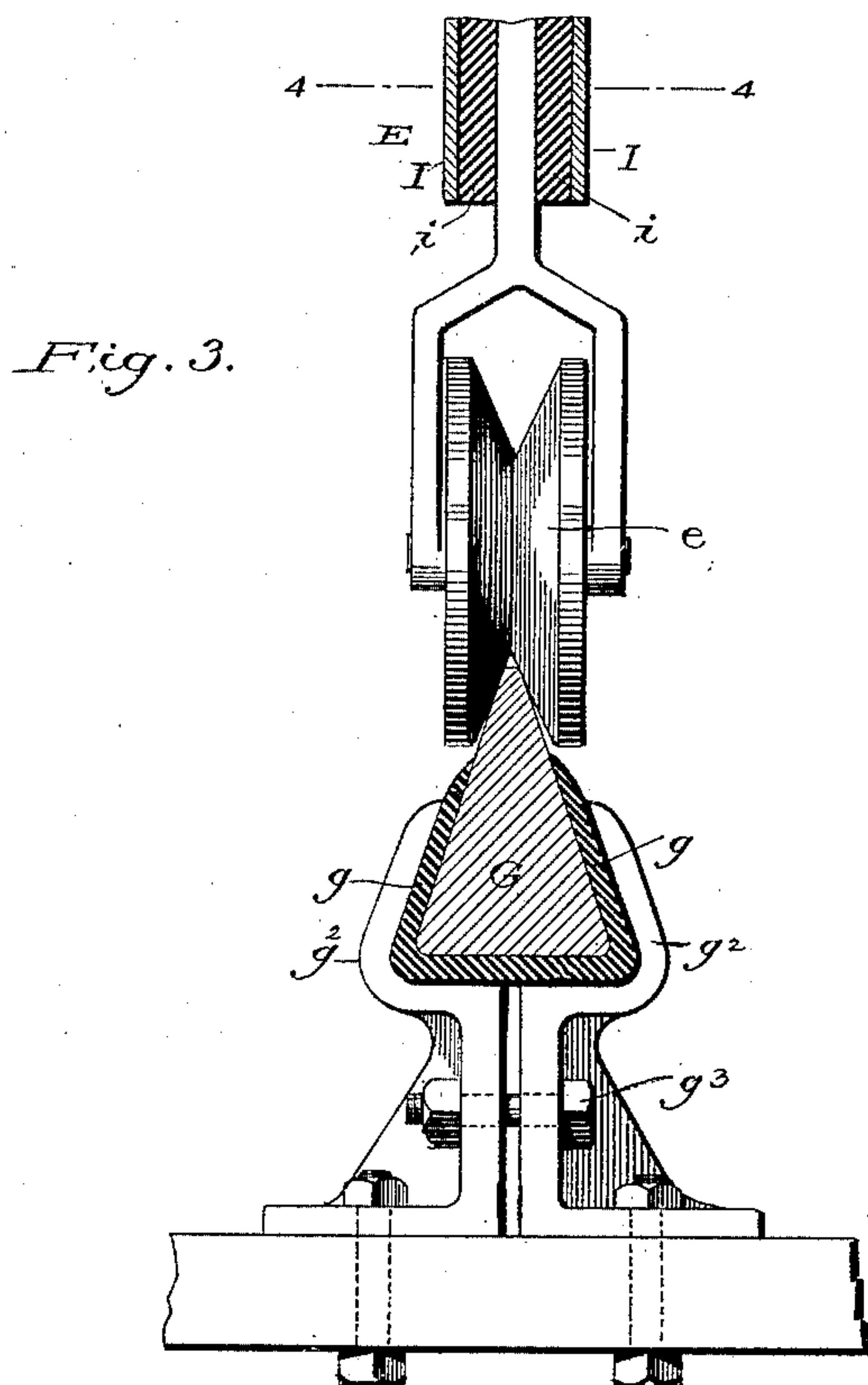


Fig. 4.
on line 4-4

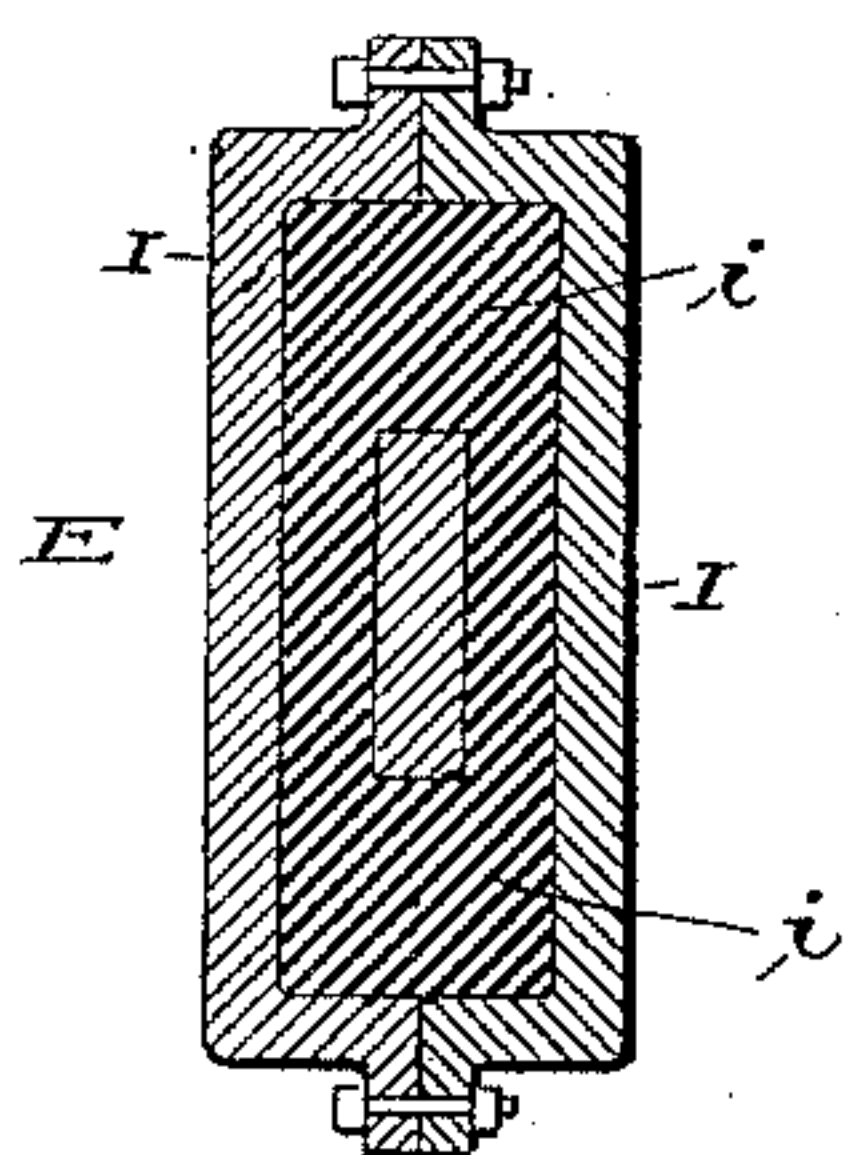
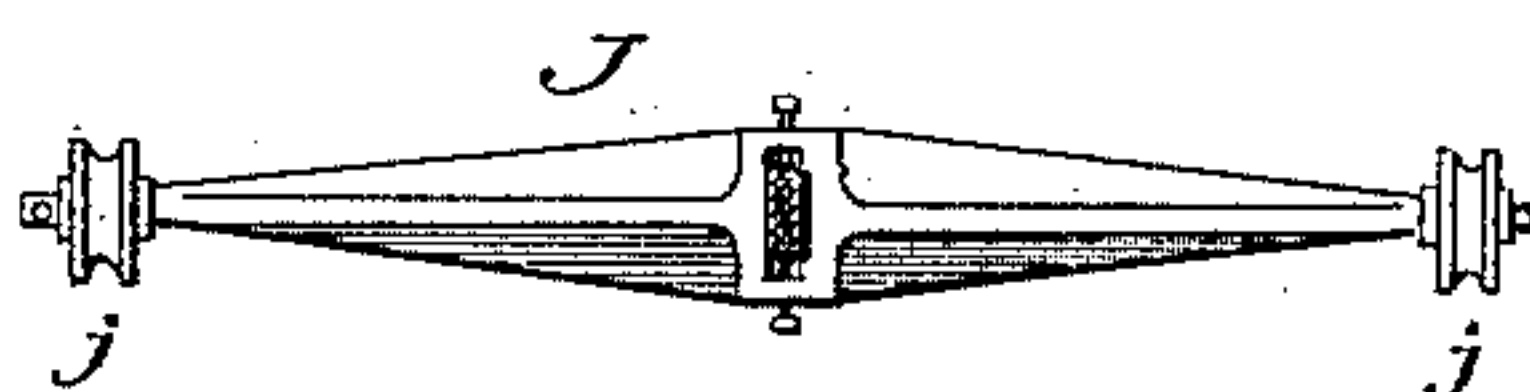


Fig. 5.
on line 5-5



Witnesses:

H. W. Mortimer.
J. W. Mortimer.
Tabris Family Elmore.

Inventor:

Julius Ensminger
By P. F. Dodge
Atty.

UNITED STATES PATENT OFFICE.

JULIUS EMMNER, JR., OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR,
BY DIRECT AND MESNE ASSIGNMENTS, TO PHILIP T. DODGE, TRUSTEE,
OF SAME PLACE.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 465,844, dated December 29, 1891.

Application filed October 30, 1890. Serial No. 369,855. (No model.)

To all whom it may concern:

Be it known that I, JULIUS EMMNER, Jr., of Washington, in the District of Columbia, have invented certain Improvements in Electric Railways, of which the following is a specification.

My invention has reference to that class of cars in which a motor located on the car receives its actuating-current through a traveling contact device, which is extended downward through a slot or opening into contact with a stationary conductor located in a tunnel or conduit beneath the surface of the ground.

The objects of the invention are to simplify the construction of the parts, insure a constant and perfect contact, and to prevent the leakage or short-circuiting of the current.

In the accompanying drawings, Figure 1 is a vertical cross-section through a railway constructed on my plan, with the car thereon. Fig. 2 is a longitudinal vertical section on the line 2 2 of Fig. 1. Fig. 3 is a cross-section of the stationary conductor on an enlarged scale. Fig. 4 is a cross-section on the line 4 4, Figs. 1, 2, and 3. Fig. 5 is a cross-section on the line 5 5.

Referring to the drawings, A represents the track-rails on which the car B is arranged to travel in the ordinary manner.

C C are two electric motors mounted on the car and adapted to impart motion to its wheels. These motors, which form no part of my invention, may be constructed and applied to the car in any ordinary and suitable manner, various motors and methods of application suitable for this purpose being known in the present day to every person skilled in the art.

D represents a flexible conductor attached at one end to the car and connected with the motors and attached at its opposite or lower end to the contact device or conductor E, which is extended downward through a slot or opening *f* into the interior of the tunnel or conduit F, its lower end being forked and provided with a conducting roller or trolley *e*, which rides constantly upon the upper edge of the stationary conducting-rail G, which is in communication with the dynamo or other source of electric supply, so that the current passes from the rail G through the roller *e*,

arm E, and conductor D to the motor. The circuit may be completed from the motor through an overhead conductor to the track-rails, or otherwise, in accordance with either of the modes now practiced in the art. The tunnel or conduit F is preferably constructed of cylindrical form and of metal and supported by metallic frames H, embedded in the ground and adapted to give support to the track-rails; but the details of these parts are not of the essence of my invention. The contact-arm E is surrounded and protected from wear against the sides of the slot by a shield I, of steel or equivalent material, insulated from the conductor proper by an intermediate layer of gutta-percha or equivalent non-conducting material *i*, as shown in Fig. 4. In order, however, that the conducting device may be advanced smoothly and easily with the car, it is sustained by a cross-bar J, having at its ends grooved or flanged rollers *j*, which travel on supporting ribs or tracks *j'*, formed in the top of the tunnel. I prefer to construct the tunnel, as shown in Figs. 1 and 2, with two horizontal plates *f'* and *f''* on each side of the slot, a sufficient space being left between these plates for the passage of the rollers, which are thus protected against displacement. It will be observed that the conductor-arm is thus supported within the tunnel by the rollers on the ends of the cross-bar, and as a result it is free to rock or tip on a horizontal transverse axis passing through the arm. The conducting-arm is extended downward and rearward beyond its support or track, so that it acts with a trailing effect upon the rail G, with which it is held in contact by gravity. In order to relieve the conductor D from strain and to admit of the contact device riding freely, I extend a chain K or equivalent flexible connection from the car to the contact device in order to pull the latter forward.

The main conducting-rail G is made of triangular or similar form in cross-section with one edge foremost in position for the roller to ride thereon. It is inclosed, except at the upper edge, by a body of non-conducting material *g*—such, for example, as gutta-percha or equivalent compounds now known in the art. It is supported at suitable intervals by clamps

g^2 , which are supported in the frame H, and drawn together by bolts g^3 , so as to embrace the rail and its covering tightly between them. Inasmuch as the rail is completely covered
 5 and protected, except at the upper edge, it exposes but a small conducting-surface, and hence atmospheric leakage is reduced to a minimum. Owing to its form, the water and solid matters which may fall through the slot
 10 into the tunnel are prevented from lodging and remaining on the surface. I prefer to construct the contact-roller of such form that it will bear at the lower or outer edges of its groove against the opposite sides of the rail.
 15 Thus constructed it has a pinching action upon the rail, so that a perfect contact is insured.

Having thus described my invention, what I claim is—

20 1. In an electric railway, the combination of a tunnel or conduit having a longitudinal opening, an external car, a contact-arm connected to the car and extending into the tunnel to contact with the conductor, and a
 25 wheeled support for said contact device, said support constructed to admit of a tipping movement of the arm on a horizontal axis.

30 2. In an electric railway, the combination of a tunnel or conduit having a longitudinal opening, an external car, a contact-arm flexibly connected to the car and extending into the tunnel to contact with the conductor, op-

positely-extending horizontal arms attached to the contact-arm, rollers mounted on the outer ends of the arms, and a track or way
 35 for said rollers, whereby the contact-arm is permitted to tip on a horizontal axis.

3. In an electric railway, the tunnel having a longitudinal opening, an internal central conductor and tracks or bearings extending
 40 on both sides of the conductor, in combination with the central contact-arm extending into the tunnel, and its wheeled support arranged to travel upon the tracks of the tunnel, substantially as described. 45

4. In an electric railway, the tunnel constructed with the longitudinal opening and the plates f' f^2 , having between them a space for the passage of the truck or support for the contact device. 50

5. In an electric railway, and in combination with an external car, a tunnel having a longitudinal slot or opening, a longitudinal conductor in said tunnel, a contact-arm connected to the car and mounted to rock on a horizontal
 55 axis, and a draft device connected to the car and to the contact-arm above its axis.

In testimony whereof I hereunto set my hand, this 28th day of October, 1890, in the presence of two attesting witnesses.

JULIUS EMMNER, JR.

Witnesses:

W. R. KENNEDY,

FABIUS STANLY ELMORE.