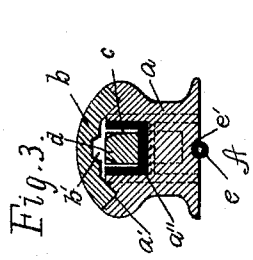
No. 777,124. PATENTED DEC. 13, 1904.

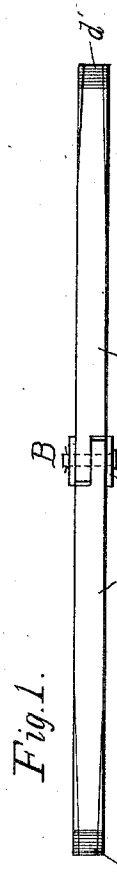
J. M. MORGAN.

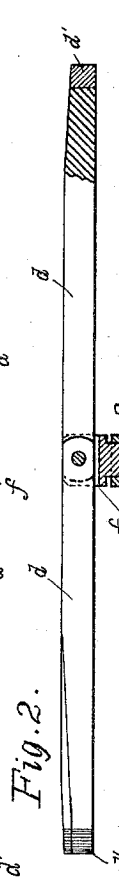
MAGNET CONTACT FOR PROPULSION OF CARS.

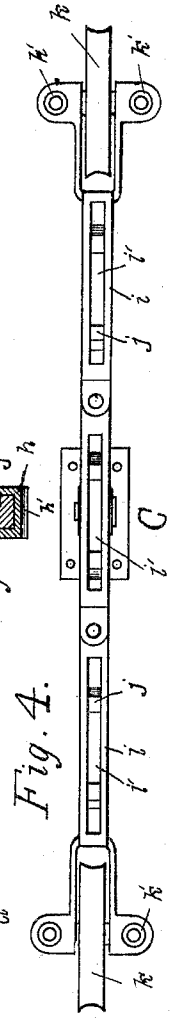
APPLICATION FILED JULY 28, 1904.

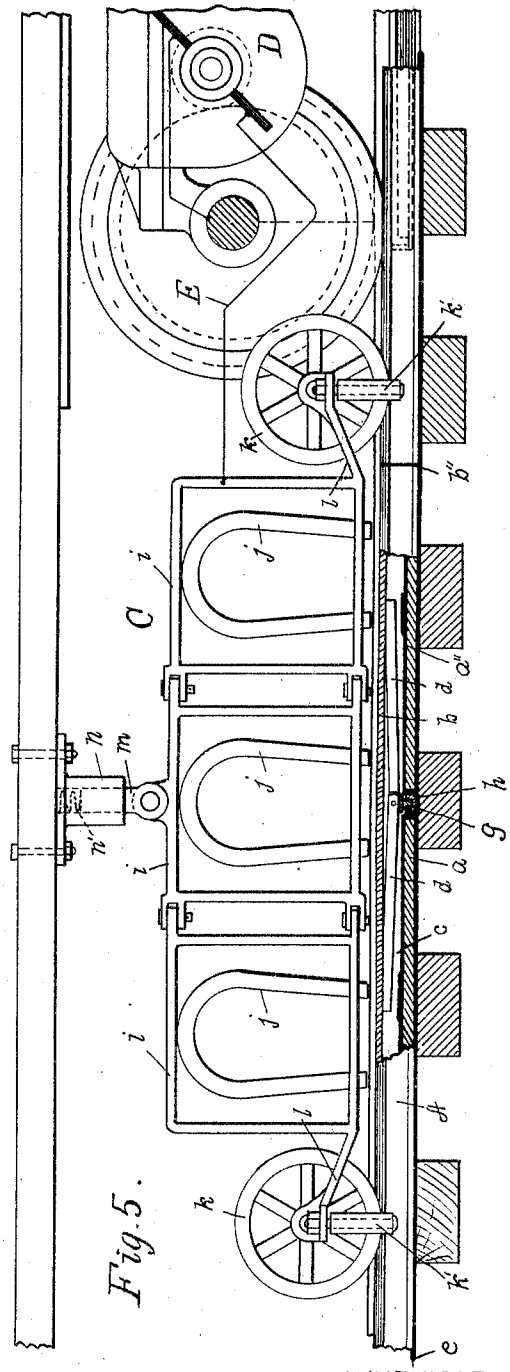
NO MODEL.











WITNESSES:

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No. 777,124. Patented December 13, 1904.

UNITED STATES PATENT OFFICE.

JAMES M. MORGAN, OF TOLEDO, OHIO.

MAGNET-CONTACT FOR PROPULSION OF CARS.

SPECIFICATION forming part of Letters Patent No. 777,124, dated December 13, 1904.

Application filed July 28, 1904. Serial No. 218,507. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. MORGAN, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Magnet-Contact for Propulsion of Cars, &c.; 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 make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to magnet-contact means for use in conjunction with surface or overhead tracks, whereby each conductor-rail is independently charged as a car or other electrically-propelled vehicle passes over it and a circuit closed between the feed-wire and the motor by which the car is propelled.

The primary object of my invention is to provide simple and efficient means whereby a conductor-rail is put into electric circuit with a feed-wire only when and during the time a car or other electrically-propelled vehicle is passing over the same and the current so formed communicated to the motor on the car for propelling the same, the rail becoming dead as soon as the car has passed free thereof, thereby eliminating the dangers to persons and animals incident to the electric propulsion systems employing continually-charged conductor-rails for communicating and closing a circuit with the motor of a car when a shoe, roller, or other current-conducting means is in contact therewith.

A further object of my invention is to so construct the magnet-carrier, by means of which the armatures or contact-arms within each rail are energized to close an electric circuit during the passing of said carrier over a rail, as to permit said carrier to readily accommodate itself to follow the curves of a track on which it is traveling and also to have a vertical oscillatory movement to permit it to travel over uneven surfaces.

Other objects of my invention will be apparent from the following specification and the accompanying drawings, in which—

Figure 1 is a plan view of the armature or contact arms employed in my invention. Fig. 2 is a side elevation thereof with the supporting-stem and receiving-socket in vertical section. Fig. 3 is a cross-section of the contact-rail of my invention, showing an armature-arm in normal position therein. Fig. 4 is a bottom view of the magnet-carrier frame, and Fig. 5 is a diagrammatic elevation of my invention as applied to a car with the conductor-rail partly in section.

Referring to the drawings, A represents the conductor-rail of my invention, and consists of the base or lower portion *a* and the cap or oval surface-strip *b*, which latter has its lower outer edges formed in wedge shape to adapt them to seat within the similarly-shaped grooves *a'*, provided on the surface of the base portion *a*. The cap *b* may be secured to the base *a* in a suitable manner, and when so secured forms an air and water tight joint therewith. Disposed centrally of the upper surface of the base *a* is provided a longitudinal groove *c*, in which the contact-arms *d d* of the armatures B are loosely mounted, as hereinafter described. The cap *b*, which extends the entire length of the rail, is made of conductive material, while the base portion *a* thereof may be made of any suitable supporting material, and if of a conductive nature be insulated from the armature B in the usual manner, as shown at *a*. When the rails A of a track are positioned, the contiguous or abutting ends thereof are separated from each other by insulation *b''*, so that when a rail is charged the current will not be communicated to the next succeeding rail.

In order that the feed-wire *e*, from which the current is received, may at all times be protected from air and water, it is located within a small conduit *e'*, provided in the lower part of the base *a* the entire length thereof, and has communication with the groove *c* of said base through a vertical opening provided therein for the reception of a portion of the armature B, as shown in Fig. 5. The feed-rail *e* is properly insulated from contact with the base *a* of the conductor-rail to prevent the current from passing to the cap *b* except through the medium of the armature B.

The arms *d d* of each armature B have their inner ends pivotally connected together in rabbeted position within the U-shaped bracket *f* thereof and their outer ends tipped with copper, as shown at *d'*, for making contact with the cap *b* of a rail A when said arms are raised, as hereinafter described. In order to keep the contact-points of the copper tips polished to insure perfect contact with the cap *b*, the upper edges of the outer ends of the arms *d* are beveled or tapered, as shown, to adapt them when raised to seat snugly within a correspondingly-tapered groove *b'*, provided in alining position in the under surface of the cap *b*, said tips being kept polished by reason of the frictional engagement of the edges of the contact-arms with the sides of said groove, which also compensates for wear occasioned by repeated contact of said points.

A stem *g* projects downwardly from each bracket *f* and is adapted to extend within one of the vertical openings in the base *a* of the rail and seat within a thimble *h*, which latter rests upon a non-insulated portion of the feed-wire *e*, having its under surface grooved, as shown at *h'*, for that purpose.

The magnet-carrier C is composed of a plurality of pivotally-connected frames *i*, (shown in the drawings as three in number,) in each of which is carried a magnet *j* and is supported above the conductor-rail A of a track by means of the sliding shoes or peripherally-grooved rollers *k*, which travel thereon. The rollers *k* are mounted at either end of the carrier C between arms *l*, which project from the outer frames *i* thereof and are guided and retained in position on the rail by means of the antifriction-rollers *k*, which are mounted on spindles projecting downwardly from the arms *l* on either side of the rollers *k* and engage the sides of the rail, as shown in Fig. 5. The lower portion of each frame *i* is provided with an opening *i'*, through which a portion of the magnets *j* are adapted to project in close proximity to the conductor-rail.

The carrier C is attached to a car by means of a pivotally-mounted stem *m*, projecting from the central frame *i* thereof and operating loosely within a socket *n*, which is secured to the car-body and allows for vertical play of such body. The movement of the stem *m* within said socket is cushioned or neutralized by means of a compression-spring *n'* or other suitable means.

The object of pivotally connecting the frames *i* together in the manner shown is to enable the magnets and rollers or shoes *k*, carried by said frames, to at all times be directly over and follow the course of a track no matter what the curvatures of the same may be, while the object of pivoting the stem *m* to the carrier is to provide for an oscillatory movement of said carrier with respect to the car to enable it to accommodate itself to the changing contour of a track-surface.

In the operation of my invention a number of the armatures B are placed within the groove *c* of a conductor-rail A as is necessary to enable one of the magnets *j*, carried by the frames *i*, to always be in position to energize one of them as the car passes along, one armature always being energized and thrown in contact with the conductor-cap *b* of the rail before the one to the rear is dropped to its normal non-contacting position, thereby insuring a continuous circuit between the feed-wire and the motor of a car and preventing a conductor-rail from becoming dead while a car is passing thereover. As the arms *d d* of an armature are energized by the magnets in the carrier C passing over them they are raised to bring the copper-tipped ends thereof in contact with the cap *b* of the rail, thereby causing an electric current to pass along the rail-cap *b* and be communicated to the motor D of the car through the carrier C and wiring E. After a carrier has passed over the last armature of a rail and charged the next succeeding rail by moving over the first armature therein the arms of the former armature drop by gravity from contact with the conductor-cap *b* of the rail and rest loosely upon the insulation *a* within the groove *c*, thus completing a circuit in a rail only when a car is passing over it and remaining dead at other times. The manner in which the contact-arms *d d* are pivoted together prevents independent lateral movement thereof and also retains the same in perfect alining position within a rail irrespective of a slanting or other position thereof.

It is obvious that my invention may be used in connection with electric railways, traveling cranes, tramways, &c., in which a conductor-rail is employed for closing a circuit with the operating-motor as it passes along the same, and also that such changes in the form, proportion, and minor details of construction of the parts as fairly fall within the scope of my invention may be made without departing from the spirit or sacrificing any of the advantages thereof.

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

1. In an electric railway, the combination of a sectional conductor-rail comprising an oval cap portion having a tapered groove in its under side and a base portion having a longitudinal groove therein, a feed-wire associated with said rail, an armature pivotally mounted in the groove in said base portion and having connection with said feed-wire and a portion tapered to seat within the groove in said cap portion, an element movable over said rail, and means carried by said element adapted to energize the armatures in said rail as they are passed over to have contact with the cap portion of said rail and communicate an electric current thereto.

2. In combination, a sectional rail comprising a conductor-strip and a base portion the latter having a longitudinal groove therein, each section being insulated from the other, a feed-wire associated with said base portion, a series of armature-arms mounted in pairs in the groove of said base portion the arms of each pair having common connection with said feed-wire, a carriage movable over said rail, means carried by said carriage for causing the armature-arms as they are passed over to be raised to have contact with the conductor-strip of said rail and communicate a circuit thereto for the purpose described.

3. In combination, a conductor-rail formed of sections insulated from each other and having a longitudinally-hollowed portion, a conductor-cap on said rail, a feed-wire insulated from sail rail, one or more pairs of copper-tipped armature-arms mounted in each rail-section, each pair of arms being pivotally connected in rabbeted position and having a common source of communication with the feed-wire, contact means movable over said rail, and means carried by said contact means for energizing the arms of the armatures as they are passed over to be raised to have contact and close a circuit with the conductor-cap of the rail.

4. The combination with a conductor-rail, a source of electricity, and armatures mounted in said rail adapted when energized to close a circuit between said source of electricity and rail, of a frame composed of a series of pivotally-connected laterally-movable magnet-sections mounted in said frame, rollers movable on the rail for supporting said frame, and a stem pivotally secured to one of said frame-sections and having yielding connection with a car-body whereby said frame is permitted to have an oscillatory and a vertical movement with respect to the rail.

5. In combination, a conductor-rail comprising sections insulated from each other and having a hollowed portion, a feed-wire insulated from said rail, one or more pairs of armature-arms mounted in the hollowed portion of the rail in normally non-contacting position, a stem to which each pair of arms is pivoted, a socket having connection with the feed-wire and adapted to receive the free end of said stem whereby a charge is communicated to said arms, and means movable over said track for causing said arms to be raised to have contact with the conductor-rail as they are passed over.

In testimony whereof I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

JAMES M. MORGAN.

Witnesses:
THOMAS M. FRANEY,
C. W. OWEN.