

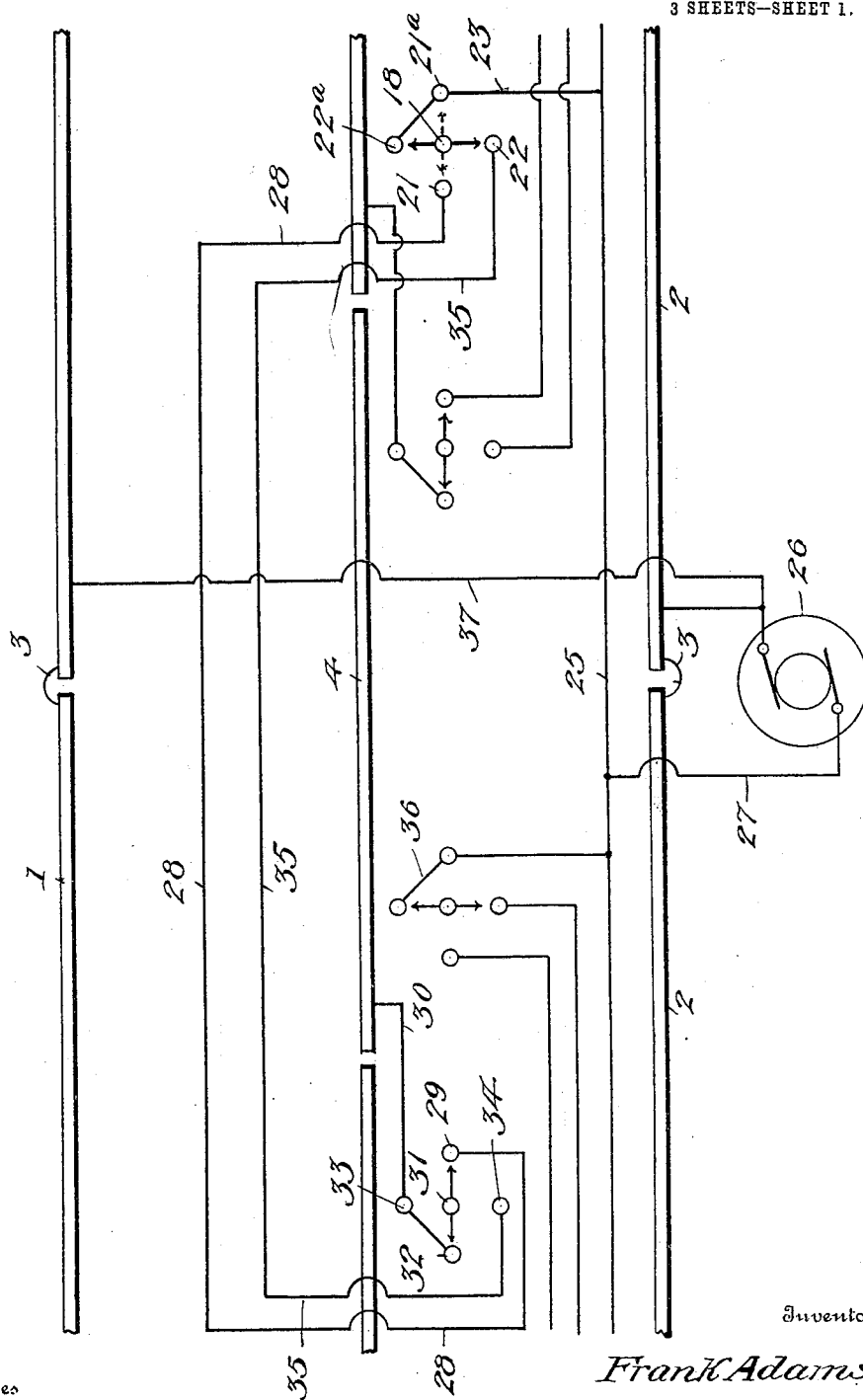
No. 807,984.

PATENTED DEC. 19, 1905.

F. ADAMS.
ELECTRIC RAILWAY.
APPLICATION FILED JAN. 30, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

Fig. 2.

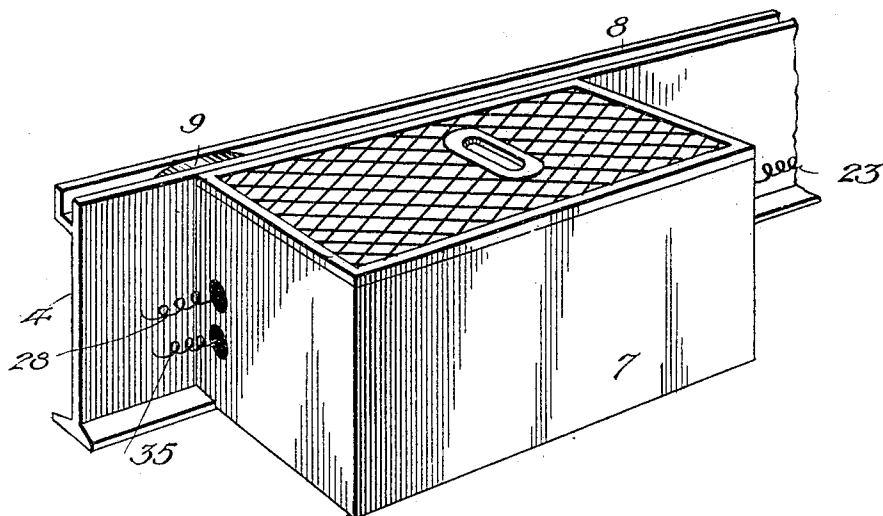
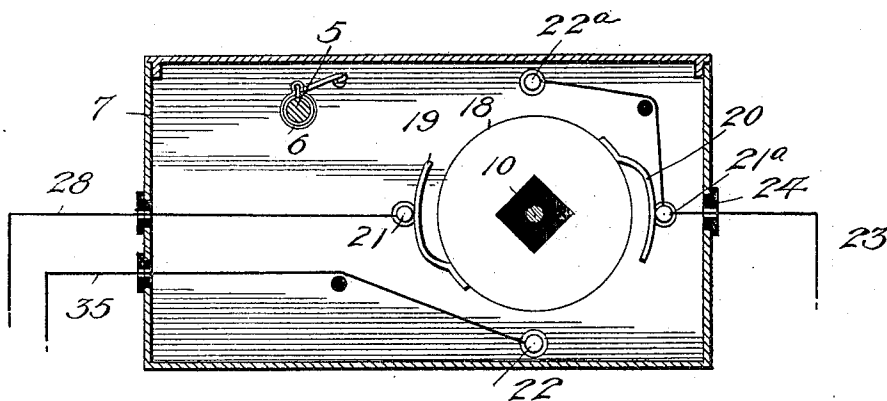


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 3.

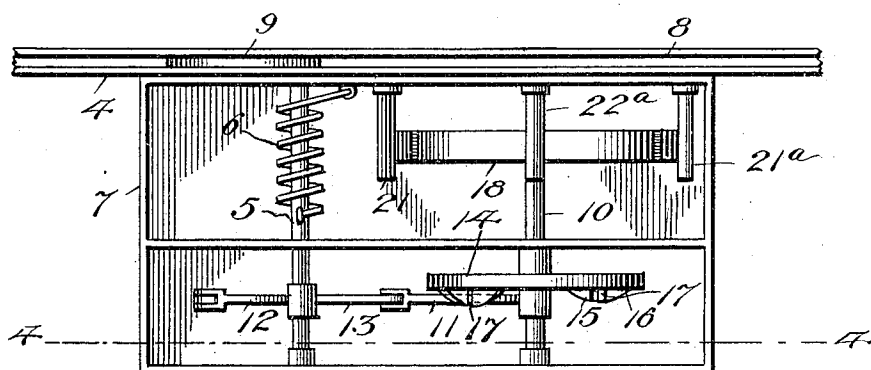
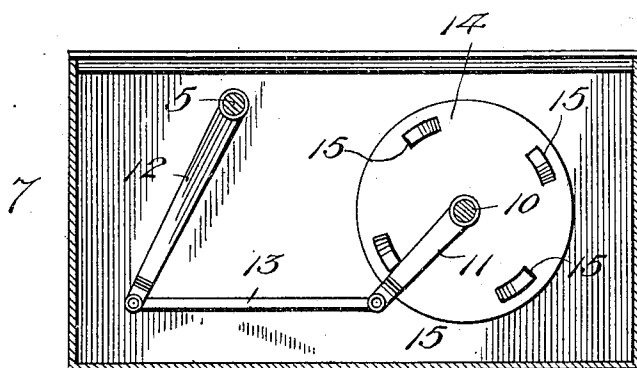


Fig. 4.



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ELECTRIC RAILWAY.

No. 807,984.

Specification of Letters Patent.

Patented Dec. 19, 1905.

Continuation of application Serial No. 119,553, filed August 13, 1902. This application filed January 30, 1904. Serial No. 191,336.

To all whom it may concern:

Be it known that I, FRANK ADAMS, a citizen of the United States, residing at North Adams, in the county of Berkshire and State of Massachusetts, have invented new and useful Improvements in Electric Railways, of which the following is a specification.

This invention relates to electric railways; and the present application is a substitute for my prior abandoned application, filed August 13, 1902, Serial No. 119,553.

One object of the invention is to provide means whereby the conductor-rail will only be energized for a portion of its length, whereby the consumption of the current will be minimized.

Another object is to provide means whereby the current will be shunted into each contact-rail section immediately preceding the car and before the car passes over the same and again cut out with respect to the rail-section after the car has left said section.

Other objects, as well as the novel details of construction and manner of operating the system, will be specifically referred to hereinafter, reference being had to the accompanying drawings, in which—

Figure 1 is a diagrammatical view of a section of a road equipped with my system. Fig. 2 is a perspective view of the switch-operating device applied to a rail. Fig. 3 is a top plan view of the switch-operating mechanism, the top of the housing therefor being removed. Fig. 4 is a side elevation of the levers and disk for operating the switch, the view being on the line 4 4 of Fig. 3. Fig. 5 is a view in elevation of the switch-binding posts and feed-wires, the switch-operating shaft being shown in section.

The reference-numerals 1 and 2 designate the ordinary traction-rails of a road, the track consisting of a number of rails secured together in the ordinary manner and provided with bonds 3. Interposed between the rails and running parallel therewith is the contact-rail 4, which comprises a plurality of sections of suitable length arranged in alinement and running longitudinally of the road-bed. These sections may be of varying lengths, according to the locality and conditions under which they are used, being preferably shorter for cities and thickly-populated communities than for outlying districts. The reason for this is that it is desirable to have as short a length as possible energized at one time, so as

to reduce the cost of providing current and also to reduce the liability of shock to a person coming in contact with the rail. It is desirable to energize each section of the contact-rail immediately before the car passes thereon and to have the section continuously energized until the car passes over the same and has passed to the next advance energized section in order to prevent sparking. In order to accomplish the result, I provide mechanical switches arranged at predetermined points along the road, whereby the current can be shunted into and cut out from circuit with the rail-sections. The switch mechanism comprises a journaled shaft 5, on which is wound a coil-spring 6, the convolutions of which surround the shaft, the spring being attached at one end to the shaft and at the other end to the walls of a housing 7, which entirely surrounds the mechanism and is practically proof against changes of climate and other atmospheric conditions, whereby the inclosed mechanism may be effectually protected against deterioration. The housing is arranged adjacent one of the sections of the contact-rail 4, which rail is provided with an approximately U-shaped slot 8 in the tread thereof, in which slot is a trip-lever 9 on the adjacent end of the shaft 5, said lever 9 being designed to be engaged by the shoe (not shown) on the car to rotate the shaft, as will be explained hereinafter. Running parallel with the shaft 5 is a similar shaft 10, and arranged adjacent to one end of the latter shaft is a depending lever 11, approximately parallel with a lever 12, depending from the shaft 5, said levers 11 and 12 being connected by a link 13. Arranged adjacent to the lever 11 and keyed to the shaft 10 is a disk 14, provided on one side with a plurality of equidistant laterally-projecting lugs 15, provided with cam-surfaces 16 at their outer extremities, and on one side of which are shoulders 17, so that the lever 11, which has sufficient yielding action, may slide over the cam-surfaces and engage or snap behind the shoulders 17 of the respective lugs or projections, and thus rotate the disk and shaft through the medium of the spring-actuated shaft 5. At a suitable point on the shaft 10 is a disk 18, carrying spring-contacts 19 and 20 diametrically opposite to each other, said contacts being secured to the periphery of the disk and having spring-fingers projecting in opposite relation. Ar-

ranged beyond and about the disk at equal distances apart are binding-posts 21 and 21^a and 22 and 22^a, each pair of which is designed to be engaged simultaneously by the fingers of the spring-contacts. Connected to the binding-posts 22^a and 21^a is a feed-wire 23, which passes out through an opening in the side of the housing 7 and is insulated therefrom by a resilient packing 24, composed of suitable non-conducting material. This wire 23 is in communication with the feed-wire 25, which is connected direct to the dynamo 26 by the conductor 27.

From the binding-post 21 leads a wire 28, which passes along the contact-rail section and is connected to the binding-post 29 of a second switch arranged adjacent another one of the contact-rail sections and which is provided with precisely the same mechanism as the switch just described, except that the wire connections thereof are somewhat different. Instead of the wire 30 (which corresponds to the wire 23 in the first switch) leading to the feed-wire it leads to the contact-rail 4. Thus by throwing the spring-contacts so that they will contact with the binding-posts 21 and 21^a, as shown in Fig. 5, the current will pass from the feed-wire 25 to the wire 23, from binding-post 21^a through the switch to binding-post 21, thence traverse the wire 28 to binding-post 29 through the switch 31, through binding-posts 32 and 33, through the wire 30 to the contact-rail 4.

As shown in the diagrammatical view in Fig. 1, the circuit is broken; but as the car traverses the track the shoe thereon will press upon the trip 9 in the groove 8 of the rail, thus imparting a rotation to the shaft 5. This will cause the lever 12 to swing from left to right and to swing the lever 11 with it until said lever 11 rides over and beyond the cam-face 16 of the adjacent lug 15 on disk 14 and comes behind shoulder 17 of said lug, so that when the car-wheel leaves the trip 8 the spring 6, which has been wound up by the movement of shaft 5, will exert its retractile energy to swing the levers 11 and 12 in the reverse direction, thereby causing lever 11 to engage the above-mentioned lug and turn the disk 14 a prescribed distance, thus causing said disk 2 to throw the contacts from engagement with the posts 22 and 22^a to contact with the posts 21 and 21^a, thus completing the circuit and energizing the rail-section, as above described. As the car passes over the rail-section the shoe will engage the trip for the succeeding switch, and thus throw the switch-disk 31 out of contact with the binding-posts 29 and 32, thus breaking the circuit. It will be assumed now that the contacts on the disk 31 are in engagement with the posts 33 and 34 and that the contacts on the switch mechanism are in contact with the posts 21 and 21^a, as shown in dotted lines. The next car which passes will actuate the

disk, so as to throw the switch-contact in engagement with the posts 22 and 22^a, thereby causing the current to pass from the motor through the feed-wire 25, through the wire 23, past the binding-post 21^a to 22^a, thence through the disk 18 to the binding-post 22, thence through the wire 35 to the binding-post 34, to the binding-post 33, and thence to the rail-section 4 through the wire 30. As the car passes off the section 4 it will strike the trip for the switch mechanism, so as to actuate the disk 31 to throw the fingers again into contact with the binding-posts 29 and 32, leaving the fingers on the disk 18 in contact with the posts 22 and 22^a, thus breaking the circuit. Just previous to doing this, however, the switch mechanism (designated by the reference-numeral 36) will have been actuated in precisely the same manner as the switches previously described, thus throwing the succeeding rail-section in circuit.

It is to be observed that in order to complete the circuit the contacts on the respective disks must be in substantially the same relative position—that is to say, when the fingers are vertically opposite each other in one switch it is necessary that the next succeeding switch be arranged precisely the same before the circuit is completed. As soon as the disk is operated so as to cause the fingers to move to a horizontal position in one of the switches the current will be broken and remain so until the next switch is actuated to cause the spring-fingers to also assume a horizontal position. It is also observed that the switch is not directly thrown to move the contacts out of engagement with the post 22 by the action of the wheel on the car in engaging and depressing the trip 7, but is merely set for operation by such action of the car in depressing the trip, the spring 6 serving to throw the switch to disengage the contacts from the post 22 after the car-wheel has moved out of engagement with and released the trip 9, so that an interval of time elapses after the wheel moves past the switch before the switch is operated to break the circuit and deenergize the rail-section. This is an important feature of the present invention, as by this construction the switches at the far and near ends of adjoining sections of the rail in the direction of travel of the car may be simultaneously or substantially simultaneously operated to energize the section upon which the car enters simultaneously with the deenergizing of the section which the car is leaving, thus preventing sparking, as will be readily understood. This action is obtained by reason of the fact that a sufficient interval of time elapses between the release of the trip 9 of the deenergizing-switch and the engagement of the wheel of the car with the energizing-switch of the rail-section in advance thereof to permit said energizing-switch to be operated simultaneously

with or shortly subsequently after the operation of the deenergizing-switch by its operating-spring 6.

The current which is supplied by the contact-rail 4 can be taken therefrom by any preferred form of trolley and by passing through the motor will find its way by suitable means to the rails 1 and 2 and through the medium of the rail 37 will be returned to the dynamo 26.

In order to reduce the cost of construction, I have provided the rail 4, constructed so as to obviate the necessity of a conduit. However, it is obvious that a different form of rail could be used, if desired, and the mechanism could be contained in the conduit without materially departing from the spirit of this invention, and I therefore reserve the right to make any such changes and alterations as would properly come within the scope of this invention and without departing from the spirit thereof.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In an electric-railway system, the combination with a sectional rail, of a feed-circuit, and means for controlling said circuit comprising a switch, a trip device adapted to be engaged and moved by a car-wheel, means actuated by said trip device for setting the switch for action when said trip device is engaged and moved by the car-wheel, and means set into action by the operation of said trip device for throwing the switch when said trip device is released by the car-wheel

2. In an electric-railway system, the combination with a sectional rail, and a normally broken circuit, of a switch for closing the circuit comprising a shaft, a contact-disk on said shaft, a second disk mounted on said shaft and provided with a plurality of equidistant projections, a second shaft, a trip device connected to said second shaft, and means operated when said second shaft is rocked by said trip device to engage one of said projections on said second disk and turn said disk to impart motion through its shaft to the contact-disk.

3. In an electric-railway system, the combination with a sectional rail, and a feed-circuit, of means for controlling said circuit, comprising a switch, a trip device adapted to be engaged and moved by a car-wheel, means actuated by said trip device for setting the switch for action when said trip device is engaged and moved by the car-wheel, and a retracting-spring set into action by the operation of said trip and setting means for throwing the switch when said trip device is released by the car-wheel.

4. In an electric-railway system, the combination with a sectional rail, and a normally broken circuit, a switch for closing the circuit comprising a shaft, a contact-disk on

said shaft, a second disk on the shaft provided with equidistant projections, a lever loosely mounted on said shaft and adapted to coact with said projections to turn said shaft and disks, a rock-shaft, a lever connected thereto, a link connecting said lever with the first-named lever, a spring connected with the rock-shaft and operative to move the levers in one direction, and a trip device connected to the rock-shaft for operating the levers in the reverse direction, substantially as described.

5. In an electric-railway system, the combination with a sectional rail and a normally broken circuit, of a switch for closing the circuit comprising a shaft, a contact-disk on said shaft, a second disk mounted on said shaft that is provided with a plurality of equidistant laterally-projecting lugs having cam-surfaces, a lever depending from said shaft that is adapted to engage progressively with said lugs, a second shaft, a lever connected therewith that is designed to be engaged by a shoe from the car, and means for connecting said shaft to the first-mentioned lever, substantially as described.

6. In an electric-railway system, the combination with a sectional rail, and a feed-circuit, of means for controlling said circuit, comprising a switch, a trip device adapted to be engaged and moved by a car-wheel, setting mechanism including an actuating-shaft turned by the operation of the trip device for setting the switch for action, and a retracting-spring operatively controlled by said shaft for throwing the switch when said trip device is released by the car-wheel.

7. In an electric-railway system, the combination with a sectional rail, and a feed-circuit, of means for controlling said circuit, comprising a rotary switch, a trip device adapted to be engaged and moved by a car-wheel, means actuated by said trip device for setting the switch for action when said trip device is engaged and moved by the car-wheel, and a retracting-spring associated with said setting means for throwing the switch when said trip device is released by the car-wheel.

8. In an electric-railway system, the combination with a sectional rail, and a feed-circuit, of means for controlling said circuit, comprising an intermittently-movable switch, a trip device adapted to be engaged and moved by a car-wheel, means actuated by said trip device for setting the switch for action when said trip device is engaged and moved by the car-wheel, and a retracting-spring associated with said setting means for throwing the switch when said trip device is released by the car-wheel.

9. In an electric-railway system, the combination with a sectional rail, and a feed-circuit, of means for controlling said circuit, comprising a switch including an intermit-

tently-rotatable member and an oscillatory member for intermittently rotating the same, a trip device adapted to be engaged and moved by a car-wheel, means actuated by said trip device for moving said oscillatory member in one direction to set the switch for action when said trip device is engaged and moved by the car-wheel, and retracting means set into operation by the actuation of the trip device for moving said oscillatory element in the opposite direction to throw the switch when said trip device is released by the car-wheel.

10. In an electric-railway system, the combination with a sectional rail, and a feed-circuit, of means for controlling said circuit, comprising a switch including a rotary member provided with equidistant projections,

and an oscillatory member coacting therewith, a trip device adapted to be engaged and moved by a car-wheel, means actuated by said trip device for moving said oscillatory member to set it for engaging a projection on the rotary member of the switch, and means set into action by the operation of the trip for reversing the movement of said oscillatory member to cause it to engage said projection and turn the rotary member to throw the switch when said trip device is released by the car-wheel.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK ADAMS.

Witnesses:

THOMAS F. CASSIDY,
LEANDER PARROTT.