

No. 662,420.

Patented Nov. 27, 1900.

W. GRUNOW, JR.
ELECTRIC RAILWAY.

(Application filed Apr. 5, 1900.)

(No Model.)

Fig. 1.

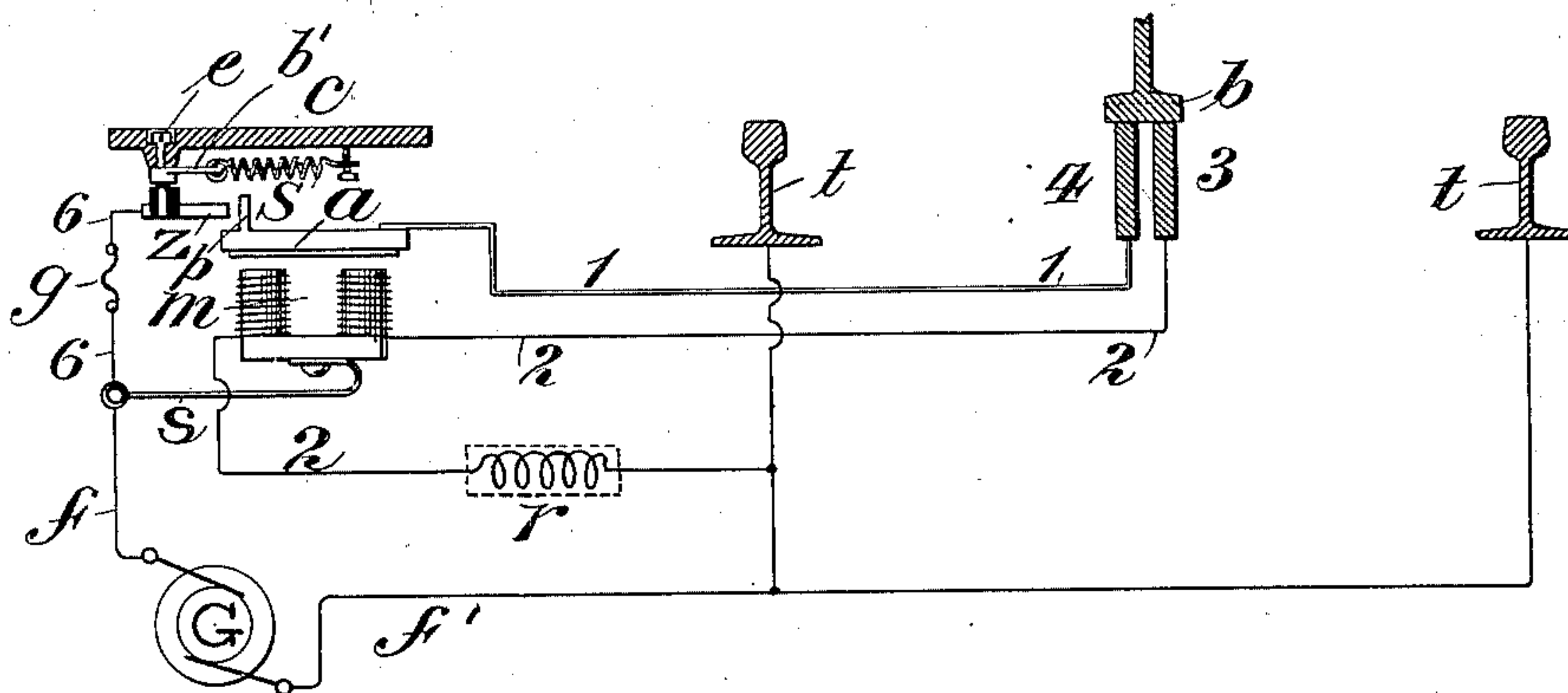
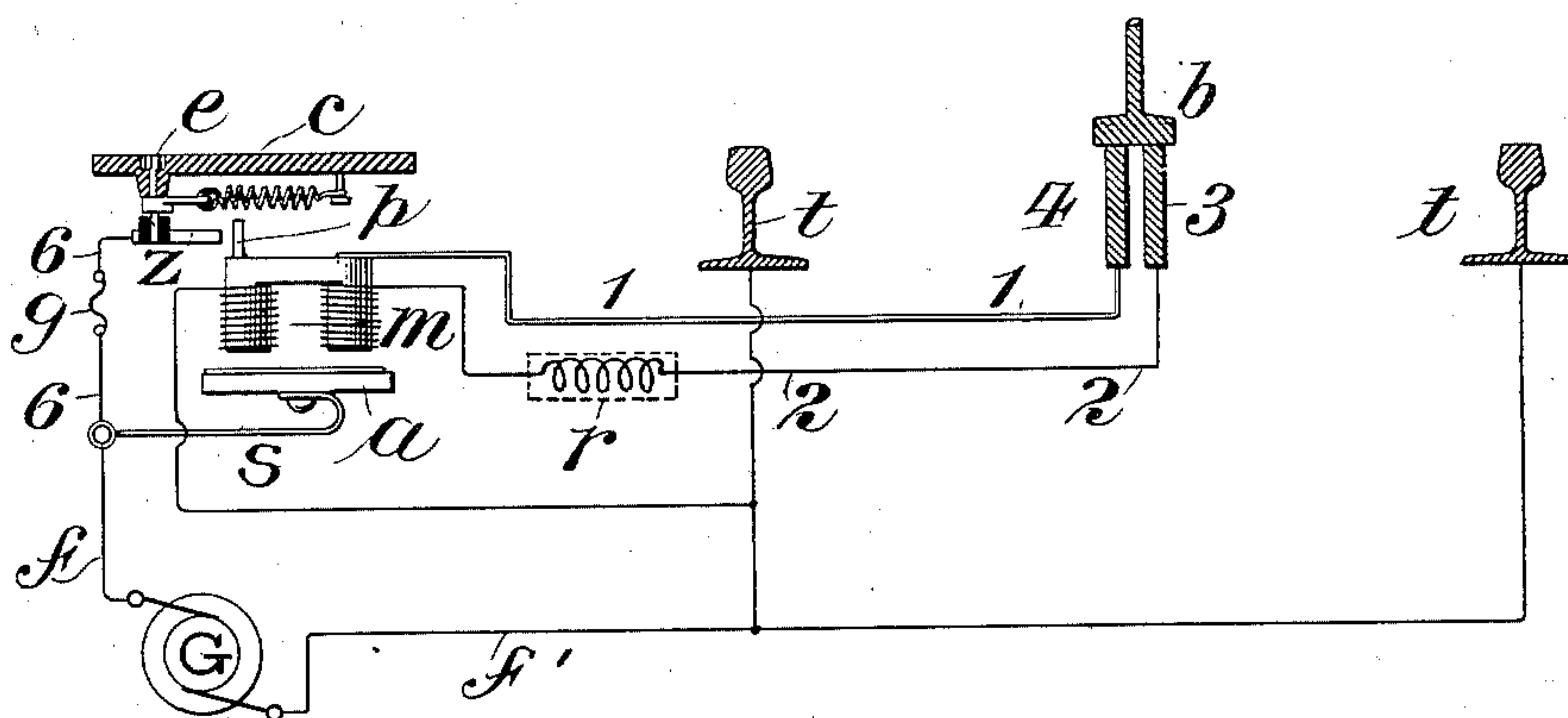


Fig. 2.



Witnesses
Edward C. Howland
M. F. Keating

Inventor
William Grunow Jr.
By his Attorney
Charles J. Kintner

UNITED STATES PATENT OFFICE.

WILLIAM GRUNOW, JR., OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE
McELROY-GRUNOW ELECTRIC RAILWAY SYSTEM, OF SAME PLACE.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 662,420, dated November 27, 1900.

Application filed April 5, 1900. Serial No. 11,646. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GRUNOW, JR., a citizen of the United States, and a resident of Bridgeport, county of Fairfield, and State of Connecticut, have made a new and useful Invention in Electric Railways, of which the following is a specification.

My invention has for its object to provide manual switching mechanism at intervals along the roadway of an electric railway of the surface-contact type which shall be so arranged and interconnected with the sectional rails or conductors located in the road-bed and the switch operating or controlling electromagnets therefor that a motorman may readily reestablish the circuit between the current feeder or main after it has been disrupted at any switch under or adjacent to a car and will be understood by referring to the accompanying drawings, in which—

Figure 1 is a diagrammatic view illustrating the tram-rails, sectional rails or conductors, trolley-shoe of a tram-car, and the cover of a switch-box located at one side of the road-bed, all in sectional view. Fig. 2 is a view similar to Fig. 1, the only difference being that in this instance the armature of the switching-magnet is made the terminal of the feeder or main instead of the magnet itself.

My invention contemplates the avoidance of the use of storage batteries or other electrical generators on board of tram-cars for the purpose of automatically effecting the closure from the current feeder or main to and through the branch conductors, the sectional rails or conductors, the trolley-shoe, and propelling-motors on board of the car as it travels over the route; and to this end it consists in placing a manually-operative switch in each switch-box beside or in the road-bed having an exterior or exposed part in the top of the switch-box which will enable the motorman, with a special wrench or tool, to quickly reestablish the circuit should it once be broken and to as quickly break the switching-circuit after the switch is released. It includes also the combination of an automatic cut-out with such a switch for the purpose of protecting the manual switch should the system be tampered with by mischievous persons.

My invention will be fully understood by referring to the accompanying drawings, in all of which like letters and figures of reference represent like or equivalent parts.

t t represent the tram-rails of an ordinary railway, and 3 4 sectional rails or conductors located side by side in the road-bed, *b* being a trolley-shoe.

1 is a branch feeder running from the supply-conductor 4 to its terminal, in this instance a stationary armature *a*, located in a switch-box, and 2 is a branch conductor of the energizing-coils of the switch-controlling magnet *m*, running from the energizing-conductor 3 through a resistance *r* and thence to the tram-rails or return feeder or main *f'* and generator at the power-house. The other pole of the generator *G* is connected by the current feeder or main running through all of the switch-boxes and to the flexible conductors *s* and the feeder-terminal located therein, the arrangement being such that when the magnet *m* is energized it is lifted into contact with the armature *a*, thereby closing the working circuit directly from the feeder *f* through the flexible conductor *s*, the cores of the magnet *m*, armature *a*, branch feeder 1 to the sectional supply rail or conductor 4, and thence through the trolley-shoe *b* when the latter is in contact with the rails 3 and 4 and the motor on board of the car to the tram-rails *t*, back again by the earth to the other pole of the generator.

6 is a branch conductor constituting a part of the switching-circuit and including in its circuit an automatic cut-out or fuse *g*, the other end of the conductor 6 being connected directly to a yielding conducting switching-arm *z*, which is attached to a turn-shaft mounted in the top of the switch-box *c* and provided on its outer side with a five-sided nut-head *e*, which, however, may be of any other desired shape adapted to receive a corresponding wrench carried by the motorman on board of the car.

b' is an arm attached to the pivot-rod, and *S* is a strong spiral spring having one end secured to the outer end of said arm and the other end attached to the inner surface of the box *c*, the arrangement being such that under normal conditions the yielding conduct-

ing-arm z is held out of electrical contact with an upwardly-extending conducting-pin of the supply-rail terminal or armature a . The conducting-arm z is insulated from its turn-
 5 shaft and is preferably furnished with contacting surfaces of carbon.

The operation is as follows: Suppose the current had been cut off at the power-house and is again generated as when daily start-
 10 ing the operation of the system in the early morning. For the purpose of restoring the current the motorman applies his wrench to the nut e , turning the switch in such direction as to oppose the action of the spring S and bring the free end of the arm z against
 15 the contact-pin p . Consequently a circuit is closed from the generator G by the feeder f or its terminal, conductor 6, fuse g , conductor 6, switching-arm z , pin p , armature a ,
 20 branch feeder 1, sectional supply rail or conductor 4, trolley-shoe b to the controller and motor. A further circuit, however, is maintained and continued through the shoe to the sectional energizing rail or conductor 3, con-
 25 ductor 2, coils of the magnet m , conductor 2, resistance r to earth, and thence by return-circuit f' to the generator. Hence the current continues to flow, so that the motorman may release the switch and proceed on his journey
 30 by operating the controller on board of the car.

The arrangement shown in Fig. 2 is substantially like that in Fig. 1, except that the armature a forms the terminal of the feeder f , being connected by a flexible conductor s
 35 thereto, the magnet m in this instance being the terminal of the supply rail or conductor 4.

I do not limit myself to the especial arrangements or design of switching mechanism described and shown for reestablishing
 40 the circuit between a station-generator and the sectional rails or conductors beneath a tram-car provided with a trolley-shoe, as I believe I am broadly entitled to claim switches
 45 located at intervals corresponding to the location of the sectional rails or conductors beneath the car for manually effecting a reestablishment of the circuit through the branch feeders and circuit-controlling magnets, and
 50 my claims are generic as to such manual switch. I am aware, however, that it has been heretofore proposed to close the operating-circuit between the current-feeder, the controlling-magnets, and sectional rails or
 55 conductors located beneath the road-bed when the current has been lost by the agency

of a permanent magnet adapted to act from without upon an armature located in a switch-box and beneath a non-magnetic cover in such manner as to attract said armature
 60 and effect such closure, and I make no claim other than to a switch which is adapted to be manually operated by the actual application of manual force.

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

1. A contact system of electric railways having sectional rails or conductors located in the road-bed; a station-generator and a
 70 current feeder or main extending therefrom over the route; branch feeder-circuit closers and circuit connections for operatively connecting said current feeder or main with the sectional supply rails or conductors, and a
 75 manually-operative switch having an exposed operative part and circuit connections for effecting a reestablishment of the feeder-circuit through feeder-circuit closers and sectional rails, substantially as described. 80

2. A contact system of electric railways having sectional rails or conductors located in the road-bed; a station-generator and a current feeder or main extending therefrom
 85 over the route; feeder-circuit closers and circuit connections for operatively connecting said current feeder or main with the sectional supply rails or conductors, and a manually-operative switch having an exposed operative
 90 part and circuit connections for transmitting the feeder-current to the sectional supply-rails, substantially as described.

3. A contact system of electric railways having sectional rails or conductors located in the road-bed; a station-generator and a
 95 current feeder or main extending therefrom over the route; feeder-circuit closers and circuit connections for operatively connecting said current feeder or main with the sectional rails or conductors, and a manually-operative
 100 switch for each circuit-closer having an exposed operative part and circuit connections for effecting a reestablishment of the feeder-circuit; in combination with an automatic cut-out device located in the circuit of the
 105 manual switch, substantially as described.

In testimony whereof I have hereunto subscribed my name this 4th day of April, 1900.

WILLIAM GRUNOW, JR.

Witnesses:

C. J. KINTNER,
 M. F. KEATING.