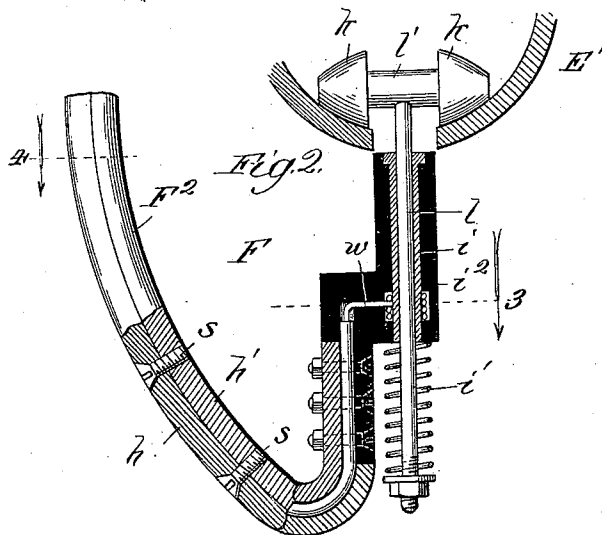
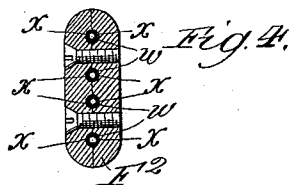
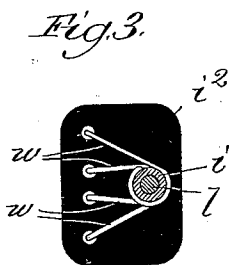
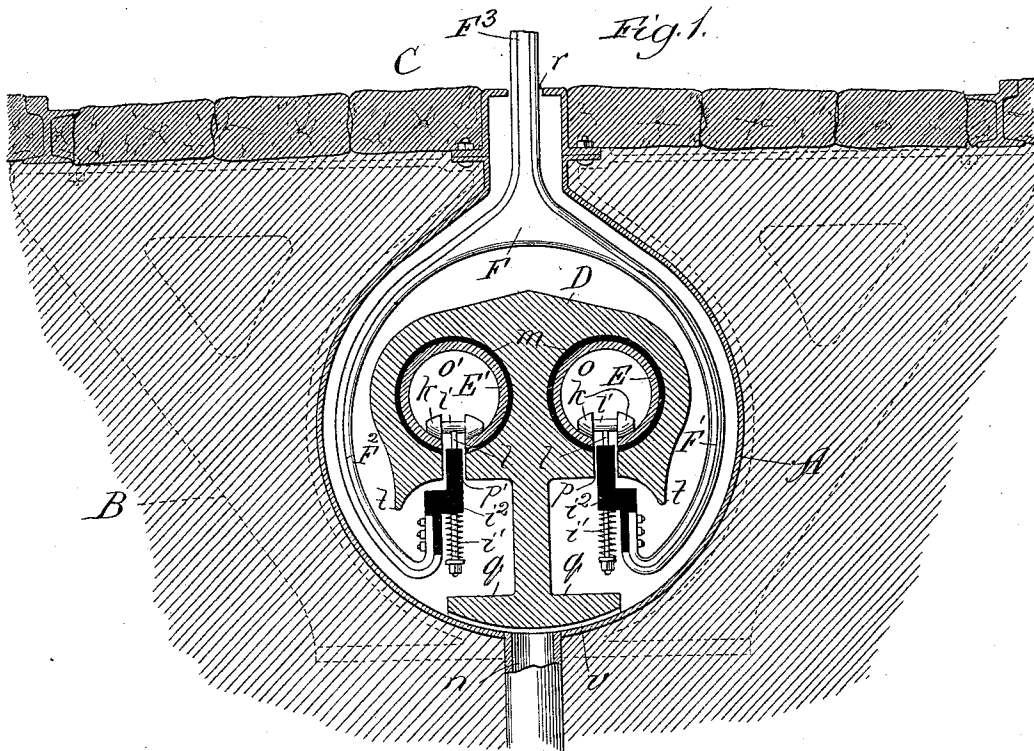


(No Model.)

R. E. SHERMAN & D. E. KENYON.
UNDERGROUND TROLLEY SYSTEM.

No. 565,240.

Patented Aug. 4, 1896.



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UNITED STATES PATENT OFFICE.

RICHARD E. SHERMAN AND DEXTER E. KENYON, OF CHICAGO, ILLINOIS.

UNDERGROUND-TROLLEY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 565,240, dated August 4, 1896.

Application filed November 12, 1895. Serial No. 568,730. (No model.)

To all whom it may concern:

Be it known that we, RICHARD E. SHERMAN and DEXTER E. KENYON, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Underground-Trolley Systems, of which the following is a specification.

The objects of our invention are to greatly simplify the construction of an underground-trolley system and thus materially cheapen the same, while at the same time increasing its efficiency in the matter of retaining the current on the conductor against tendency to leakage as the result of moisture entering the conduit through the trolley-slot.

To accomplish our aforesaid objects, we have devised the construction illustrated in the accompanying drawings, in which—

Figure 1 is a cross-sectional view showing the slotted conduit below the track and containing the housing for the slotted tubular chambers containing the insulated outgoing and return conductors with which the respective trolleys are brought into contact through the slots; Fig. 2, an enlarged broken sectional view showing the preferred construction of the trolley; Fig. 3, a section taken at the line 3 on Fig. 2 and viewed in the direction of the arrow, and Fig. 4 a section taken at the line 4 on Fig. 2 and viewed in the direction of the arrow.

A is the underground conduit, shown as of cylindrical shape and formed, say, of sheet metal, though it may be of any other desired shape and material. The conduit portion of our improved system may be, generally speaking, like other known underground-conduit structures involving metal yokes B, placed at intervals in the excavation below the surface track C, along the center of which is the slot r , leading into the conduit for the admission of the grip or trolley.

D is the conductor-housing, which we form in massive sections, say, a few feet in length, of metal or, and preferably, baked clay or masonry. Each section is of the general T shape illustrated with tubular and preferably cylindrical openings o and o' formed longitudinally through it at opposite sides of its center and into which openings longitudinal slots p and p' lead, preferably, but not nec-

essarily, from their under sides. The housing-sections bear at their bases q on the base of the conduit A and are placed in the latter end to end throughout the route and should be cemented together where they join to render the housing and the slots therein continuous. The exterior shape of the housing D is preferably that illustrated, whereby it slopes on its top from the center toward the opposite sides, which are rounded convexly throughout a portion of their extent and concavely throughout the remainder thereof and terminate in prolonged drip edges t . The advantage of the described slope of the conductor-housing is its tendency to shed moisture by directing it into the bottom of the conduit, whence it may escape through grooves v in the bottom of the housing-base q to outlets n , leading at intervals from the conduit to a sewer. (Not shown.) Inside the openings o and o' are the conductors, which we prefer to provide in the form of metal tubes E and E' , slotted longitudinally to cause their slots to coincide with the housing-slots p and p' ; and the conductors E and E' are incased, up to their slots, in insulating material m , such as glass or hard rubber, the more effectually to insulate the conductors even though the housing D be formed of baked clay, which is more or less porous.

The conductors E and E' afford, respectively, the outgoing conductor and the return-conductor for the current.

F is our improved trolley device. To serve our purpose of taking the current from one conductor and returning it to the other the trolley device is bifurcated or formed with two arms F' and F'' , though each arm involves the same construction. Hence the description of one applies to either. On one end of a metal stem l is a cross-bar l' , affording a non-rotary shaft carrying at its outer ends the metal rollers k k , which should conform to the inner contour of the tubular conductor against which they bear at opposite sides of the longitudinal slot at which the stem l enters the housing. Below the conductor the stem is surrounded by a metal sleeve i , between which and a nut on the outer end of the stem is confined, in compressed condition, a spring i' , the tendency of which is to hold the roller end of the stem

1 down against its seat on the conductor.
 About the sleeve *i* the stem *l* is surrounded
 by insulation *i*². The trolley-pole *F*³, which
 depends from the car (not shown) that car-
 5 ries the trolley device into the slot *r*, is flanked
 by the arms *F*¹ and *F*², bent inside the con-
 duct A to extend about the sides of the hous-
 ing D and connect with the stem *l* at an off-
 set in the insulation *i*². These arms are pref-
 10 erably formed of metal, each in two pieces
h and *h'*, adjusted flatwise together and fas-
 tened by screws *s*, either or both of these
 pieces being provided with longitudinal
 grooves *x* to incase the insulated wires *w*,
 15 which proceed from the motor on the car and
 are fastened to the metal tube *i*. Thus elec-
 trical connection is made between the con-
 ductors E and E' through the motor on the
 car by the branches *F*¹ and *F*² of the trolley
 20 device, thereby providing for charging the
 motor from the conductor E to drive the car
 and for returning the current to the gener-
 ator by the conductor E'.

While we much prefer the tubular form of
 25 the conductors in the housing D, they may
 be mere wires suspended in the tubular open-
 ings. Hence we do not limit our invention to
 the construction of the conductors illustrated.

What we claim as new, and desire to secure
 30 by Letters Patent, is—

1. In an underground-trolley system, the
 combination with the slotted conduit of a
 housing therein containing longitudinal slot-
 35 ted tubular openings for the outgoing and re-
 turn conductors of the line, and a bifurcated
 trolley device comprising conducting-arms
 branching from the trolley-pole and termi-
 nating in contacts and straddling said hous-
 40 ing to enter said contacts into said tubular
 openings through their slots from sides of said
 housing, substantially as described.

2. In an underground-trolley system, the
 combination with the slotted conduit of the
 T-shaped housing supported along its base on
 45 the base of the conduit and containing lon-
 gitudinal slotted tubular openings for the out-
 going and return conductors of the line, and
 a bifurcated trolley device comprising con-
 ducting-arms terminating in roller-contacts
 50 and straddling said housing to enter said con-
 tacts into said tubular openings through their

slots from opposite sides of said housing, sub-
 stantially as described.

3. In an underground-trolley system, the
 combination with the slotted conduit of the
 55 T-shaped housing D therein containing lon-
 gitudinal slotted tubular openings for the out-
 going and return conductors of the line, said
 housing having its top sloping toward oppo-
 site sides, said sides being convexly rounded
 60 at their upper portions and concaved and ex-
 tended into drip edges at their lower portions,
 and a trolley device extending into the con-
 duct through its slot and branching into trol-
 ley-carrying arms extending, respectively,
 65 into said tubular openings through their slots,
 substantially as and for the purpose set forth.

4. In an underground-trolley system, the
 combination with the slotted conduit of a
 housing therein containing longitudinal slot-
 70 ted tubular openings for the outgoing and
 return conductors of the line, and a bifur-
 cated trolley device comprising arms branch-
 ing from the trolley-pole which passes through
 the conduit-slot, and straddling said housing,
 75 each arm carrying at its end a spring-con-
 trolled metal stem terminating at one end in
 a roller-contact device within one of said
 openings, and insulated conducting-wires on
 said arms electrically connected with said
 80 stems, substantially as described.

5. In an underground-trolley system, the
 combination with the slotted conduit of a
 housing therein containing longitudinal slot-
 85 ted tubular openings, tubular conductors in
 said openings, and a trolley device *F* com-
 prising the pole *F*³ carrying the bent arms
*F*¹ and *F*² formed with grooved sections and
 having the insulated conducting-wires con-
 fined between them, each arm terminating in
 90 a spring-controlled metal stem *l* in a metal
 sleeve *i* surrounded by insulation, and con-
 nected with said wires, said stem terminating
 in a shaft *l'* carrying at its opposite ends
 rollers *k* within a tubular conductor, sub-
 95 stantially as described.

RICHARD E. SHERMAN.
 DEXTER E. KENYON.

In presence of—
 J. N. HANSON,
 J. H. LEE.