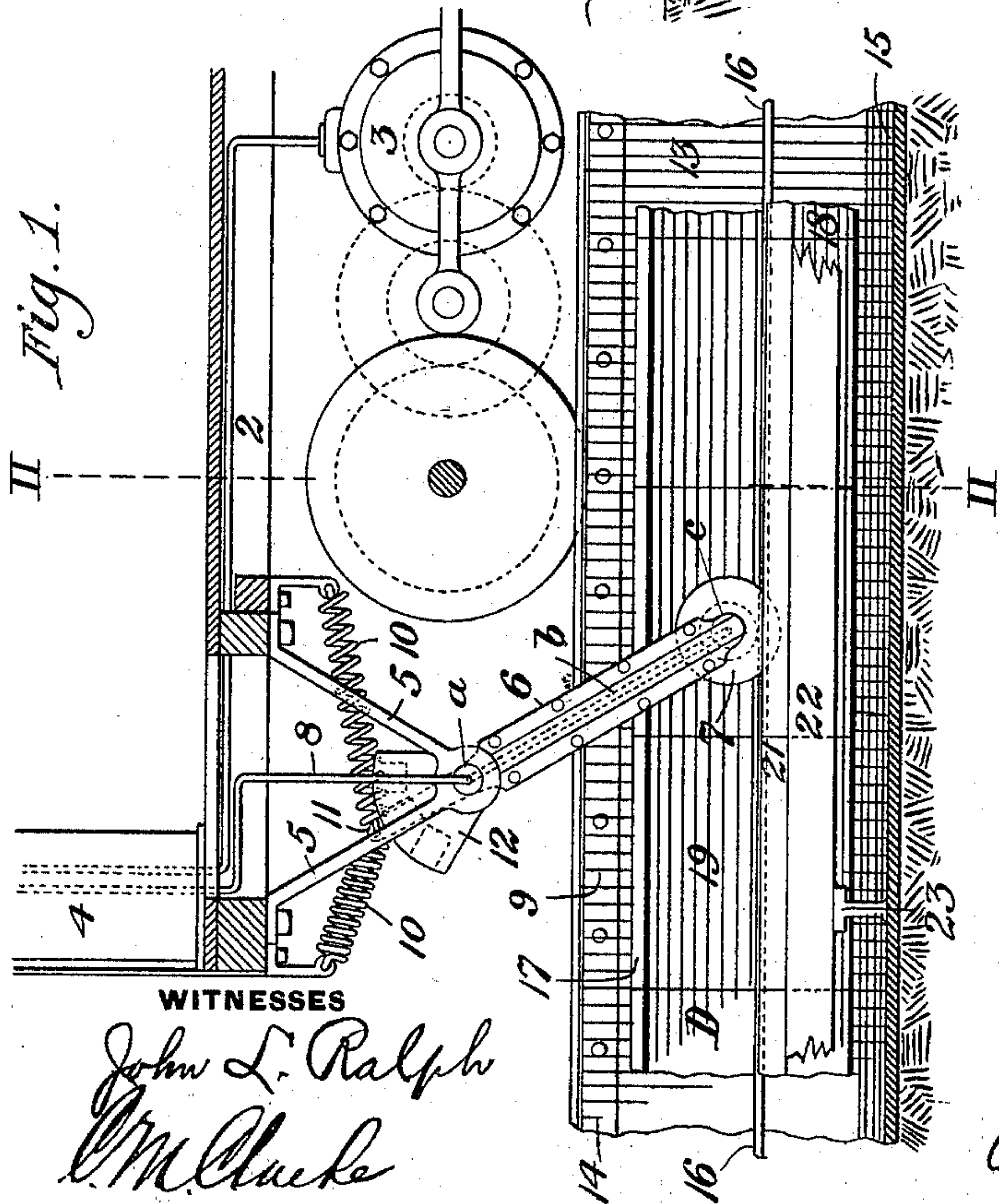
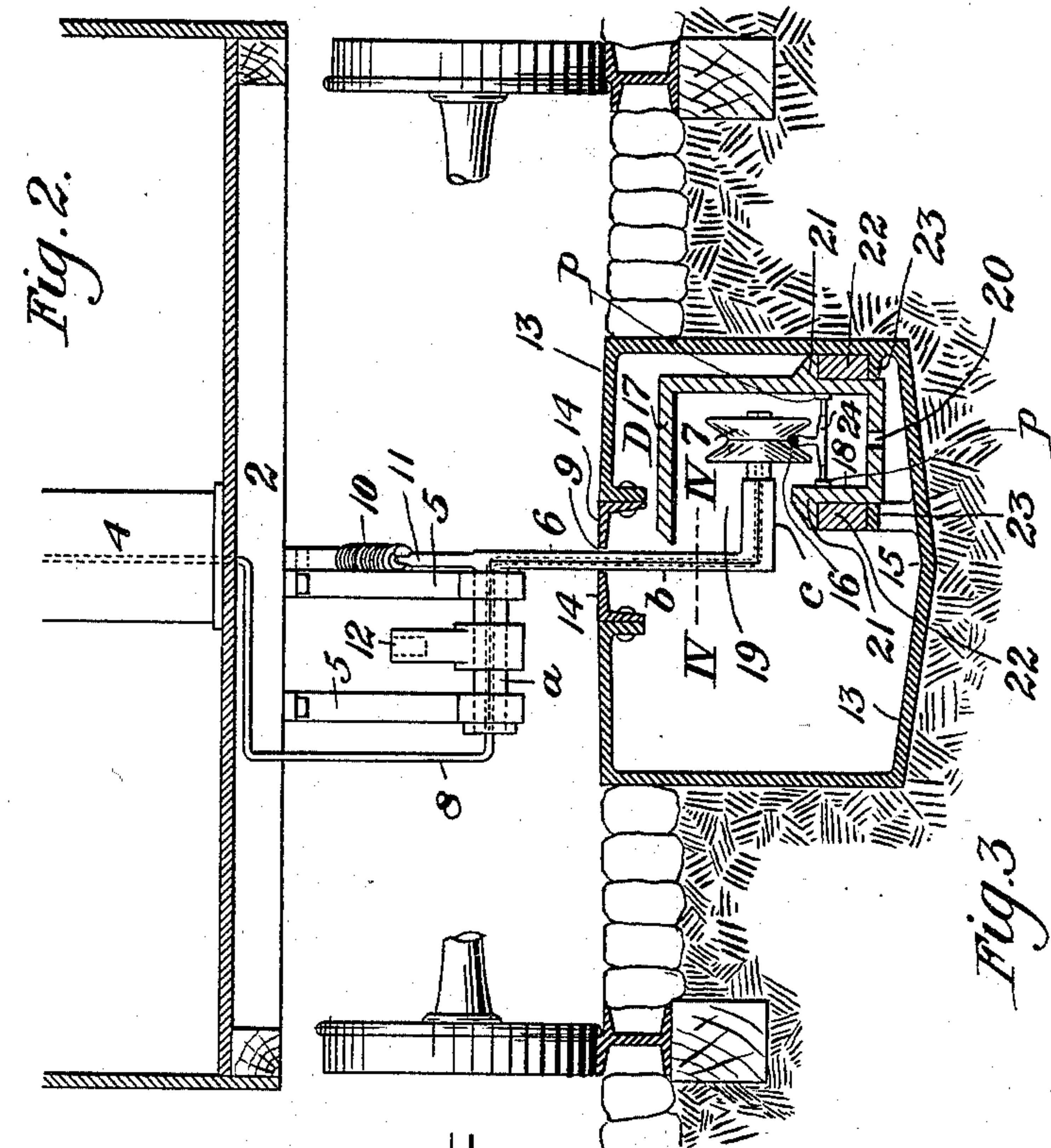


(No Model.)

J. F. COOK.
CONDUIT ELECTRIC RAILWAY.

No. 519,380.

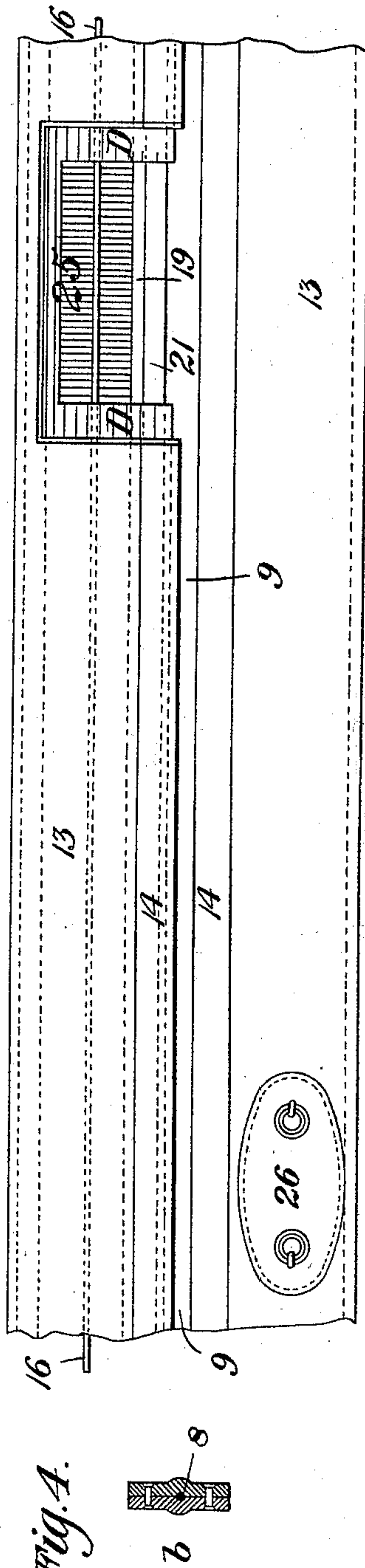
Patented May 8, 1894.



WITNESSES

John L. Ralph
M. Clucke

Fig. 3



INVENTOR

James F. Cook

UNITED STATES PATENT OFFICE.

JAMES F. COOK, OF MANSFIELD, PENNSYLVANIA.

CONDUIT ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 519,380, dated May 8, 1894.

Application filed February 5, 1894. Serial No. 499,137. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. COOK, a citizen of the United States, residing at Mansfield, in the county of Allegheny and State of Pennsylvania, have invented or discovered a new and useful Improvement in Conduit Electric Railways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal vertical section of my improved conduit and part of a car, showing the trolley arm in an operative position. Fig. 2 is a cross section through the conduit and part of a car taken on the line II II of Fig. 1. Fig. 3 is a plan view of the upper surface of the outside conduit, illustrating one of the openings in the conduit for allowing the trolley to be removed. Fig. 4 is a cross section through the trolley arm taken on the line IV IV of Fig. 2.

Like figures of reference refer to like parts wherever used throughout this specification.

My invention relates to the class of electric railways in which the current for the motor is conveyed from the conducting wire, by means of a wheel mounted on the end of a trolley arm, through the arm to the rheostat and finally to the motor.

It consists in an improved system of conduits, arranged beneath the level of the rails and situated between them, (thereby dispensing with overhead conductors and their consequent disadvantages,) by means of which the conducting wire is sustained in the interior of an earthenware, glass, or other non-conducting conduit, so constructed as to protect it from rain, snow, slush, or mud, together with an outer conduit or casing, provided with a slot for the passage of the trolley arm.

It also consists of an improved form of trolley, peculiarly adapted to the ends in view and possessing certain particular and novel advantages.

Referring to the drawings, 2 represents the framework of a car, provided with the usual motor 3 and rheostat 4. Journaled in the brackets 5, 5 secured to the bottom of the car is the trolley arm 6, consisting of the horizontal extension *a*, downwardly projecting shank *b*, and horizontal inwardly extending

arm *c* carrying the usual wheel 7. The trolley arm is preferably made in two halves, secured together and having a hollow central opening for the passage of the insulated wire 8, and the portion *b* is made preferably as thin as possible, to allow of its passage through the slot 9, which should be sufficiently narrow to prevent the entrance of vehicle-wheels. This feature of construction I have illustrated in Fig. 4, which shows the two sides of the arm flattened and riveted together, incasing the wire 8. The trolley arm may also be made in one continuous piece of hollow metal, such as a section of pipe, but I prefer the construction already described as it is more serviceable and of better construction. The upper portion of the arm may also be made T shaped, having a journal bearing at each side of the center portion, if such construction is desired. For the purpose of maintaining the trolley arm in a normally vertical position, any of the well known devices commonly used may be employed, such as spiral springs 10 10 secured to an extension 11 of the arm, thus maintaining a constant pressure of the wheel downwardly upon the conducting wire. The arm may also be provided with a socket 12 for the insertion of a lever when it is desired to reverse the position of the trolley on the wire, and any other desirable means of accomplishing this result may also be employed such as segmental gearing, arrangements of levers, &c.

I shall now describe the construction of the conduit, which consists of an outer casing 13 provided with strips 14 14 forming the slot 9 and the bottom being preferably made with the gutter 15 for carrying off any water that may pass in through the slot. Connections may be made from this gutter to a sewer or other outlet, at intervals, when desired.

The conduit proper in which is carried the conducting wire 16 consists of a continuous construction of sections of earthenware, glass, or other non-conducting boxes, made in the form shown in cross section in Fig. 2 of the drawings and generally designated by the letter D. I prefer to construct these conduit sections of earthenware or other non-conducting material as stated for the especial benefits of their durability, cheapness and non-conducting qualities, and for their general suit-

ability to this class of work. The general location of these conduit sections is somewhat to one side of the center of the slot in the outer casing for the purposes of protection from the weather, and from substances which might fall in through the slot, and also for the purpose of adaptability to the form of trolley shown. The top portion 17 is purposely made to extend considerably over past the inside vertical wall 18 as shown for the purpose of protecting the conducting wire 16 from any matter entering through the slot 9, and the wall 18 is carried only part way up to the top leaving the opening 19 for the entrance of the wheel 7, and passage of the arm c. In the bottom of the conduit are holes 20 at intervals, to allow the escape of any water that might possibly get into the inside of the box, and on each side are the lugs 21 for supporting the conduit on the stringers 22, resting on brackets 23 on the casing 13. The outside of the lugs 21 are preferably made sloping so as to deflect as much as possible any substance that might be thrown toward the interior of the box. This is not liable to happen however, for any matter entering through the slot will naturally drop directly downward, there being no currents of air or other causes to prevent it in the inside of the casing. The wire 16 may be supported at intervals by cross wires 24, attached to the conduit D and electrically insulated therefrom if desired. Thus in manufacturing the sections of the conduit D the cross wires 24 may be inserted while in the process of manufacture, being sufficiently insulated by being embedded in the non-conducting body of the conduit, but if preferred, the plugs *p* of fiber or other non conducting material may be inserted around the ends of the cross wires 24, the attachment of the wire 16 being made by soldering or brazing after the conduit is in position.

The advantages of an underground conduit for electrical conductors for street railway service, are well known, and the necessary requirements of such a conduit are that it shall be isolated from dangerous contact, and in order that it may be serviceable in all kinds of weather, it must not be liable to contact with rain, snow, mud, &c., and these advantages are possessed by my improved construction of conduit in a marked degree.

In Fig. 3 of the drawings I have illustrated at 25 an opening in the casing and also in the conduit to permit of the removal of the trolley, and man-holes, 26 may be arranged at intervals to provide access to the interior of the casing at any time for the purposes of repair or cleaning.

Changes and modifications of my construction may be made within the scope of my invention, as suggested by the skilled mechanic, without departing therefrom, as I do not wish to be understood as limiting my-

self to the form of construction shown in the drawings.

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

1. In an underground-conductor street railway system a trolley arm having a horizontal upper arm or arms journaled in bearings secured to the framework of the car, a downwardly extending middle portion made narrower than the arms for passage through a slot, and a lower horizontal arm provided with a wheel, the entire trolley arm being made of two halves secured together, and inclosing a wire in the center substantially as described.

2. In an underground-conductor street railway system a trolley arm having a horizontal upper arm journaled in bearings, secured to the framework of the car, a downwardly extending middle portion, and a lower horizontal arm provided with a wheel, the upper horizontal arm being provided with a socket for the insertion of a reversing lever, or other reversing apparatus, and an upwardly extending arm for attaching tension springs, substantially as described.

3. A conduit for a conducting wire for street railway service consisting of sections of earthenware, glass, or other non-conducting hollow boxes, placed end to end, the bottom portions forming a trough, with perforations at intervals, and having one side somewhat higher than the other, and a top shield extending out over the edge of the shorter side;—each side being provided with lugs having outwardly and downwardly sloping top faces, substantially as described.

4. A conduit for a conducting wire for street railway service consisting of sections of earthenware, glass, or other non-conducting hollow boxes placed end to end provided with an opening at the side, and a top or shield somewhat wider than the bottom, projecting out over the opening, the conducting wire being supported at intervals by cross wires, insulated from and attached to the inside faces of the sides, substantially as described.

5. The combination of the outer surrounding conduit or casing provided with a slot at the top and a gutter or channel in the bottom, with the conduit for the conducting wire, consisting of earthenware, glass, or other non-conducting hollow boxes, placed end to end, provided with an opening at the side and a top or shield, somewhat wider than the bottom projecting out over the opening and the lugs on each side of the conduit boxes resting on stringers supported by brackets on the outer conduit, substantially as described.

In testimony whereof I have hereunto set my hand this 30th day of January, 1894.

JAMES F. COOK.

Witnesses:

JOHN L. RALPH,
C. M. CLARKE.